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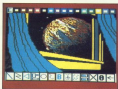
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## D A T A S T A T E M E N T S

## Soft in the Head

**S**traight in, with news of two new Bubble Bus games for the C16/Plus 4. The first is *Potom*, an addictive 3D split-screen scrolling game with more than a dozen aliens against which to pit your wit. The second is *Jazz*. *Jazz* is sent from a company, with the confidence-inspiring name of Bug Determinators Unlimited/Unreliable. You must gather a party where wild battles and razor sharp scythes are on the loose. Both are in the shops now and cost £1.99.

Alpha-Omega has just announced two new titles for the Commodore 64. These are *Gods and Heroes* and *Afformark*.

*Gods and Heroes* is a platform game and will cost £1.99. The game features 50 challenges taken from Greek mythology. You must see if you are as resourceful and courageous as the ancient heroes.

*Afformark* is a game about revenge. The Final Conflict has been lost and the barren plains of a devastated land lie before you, the Saurians rule the

planet. Penetrate the Saurian defenses and destroy their Strategic Command with a single bomb and so give meaning to your life and your death. *Afformark* is also £1.99.

If your collection of Beyond software games is incomplete then you may like to know that there is now a Revised compilation tape for the C64. Entitled *The Best of Beyond*, the Commodore version of the tape costs £9.95 and contains such classics as *Shadowfire*, *Enigma Force*, *F51 Warrior* and *Quaker Meno One*.

## FOURCHLINE

*Beyond*: Wellington House, Upper St Martin Lane, London WC2N 6DL. 01-378-3683.

*Alpha-Omega*: 9 King's Road, Carpenter's Road, London E15 2MR. 01-603-6077.

*Bubble Bus*: 47 High Street, Tinsbridge, Kent TN9 1RE. 0712-359962.

## Magnum Force

Not content with budget software, Mastertronic is entering the hardware market with the Magnum Joystick. It is heralded by Mastertronic as a new generation joystick designed to meet the demands of new generation software. Features include instant pre-activation response, floating activator, ergonomic design, hair action trigger, left or right hand usage, extra long cable and full compatibility.

## FOURCHLINE

*Mastertronic*: 8-18 Paul Street, London EC2A 4PP. 07-373-6686.



## Label Lines

Melbourne House, a company which has managed to make a name for itself in this country, is now attempting to make a name for somebody else. Melbourne House is to be the sole UK and EEC distributor of Arcade Machine games. Arcade machine is a new company totally devoted to producing top quality arcade games.

*Bazooka Ball* is the first title on this new label. Bill, the central character, is armed with a whole arsenal of weapons including knives, a machine gun, flame thrower, bazooka and a missile firing jet fighter. Basically, all he has to do is fend off an endless stream of attackers (as many as 15 on one screen) using his weaponry.

*Bazooka Ball* is priced at £9.95 and is available for the C64.

Amstrad is launching two new home grown labels to deal with British software products: an arcade label called *Reaktor* and an adventure label called *18 Steps*.

*Destruction* will be the first game on the *Reaktor* label. Priced for C64

disk and cassette are £14.95 and £9.95 respectively. On the 18 Steps label will be *They Sold a Million* an adventure in which you have the opportunity to plan the perfect robbery. Disk is £14.95 and cassette is £9.95.

**FOURCHLINE Melbourne House:** 60 High Street, Weymouth Wilt, Kingston-Upon-Thames, Surrey KT1 4RM. 01-942 2911.

*Amstrad*: 68 Long Ace, London WC2. 07-626-3415.

## Dangerous Games

In the dangerous world of adventures there's always room for refinement and improvement to add atmosphere and thrills to even the best game. With this in mind Rainbird has taken three classic Level 9 games, compiling the jewels of darkness trilogy, rewritten them and produced them on either three cassettes or one disk. For those who don't remember the three games

in the trilogy are: *Colossus Adventure*, *Adventure Quest* and *Dangerous Adventure*. The price for either the three cassette pack or the disk is £14.95 and both are available now.

In logarithmic latest adventure there is only one way in which you can get yourself out of poverty and into the world of the financially secure - win £1 million in one night in Las Vegas. The name of the game is *The Intervention* - I calculated Panic in Las Vegas - and it's a three part adventure. First you must get out of your hotel, then make your way to the airport and thence to Las Vegas to win your £1 million. It's on cassette and costs £9.95.

One very popular cartoon concept which has never been transferred to computer is *The Adventures of Asterix the Gaul*. Melbourne House is about to put this right by releasing an Asterix adventure *The Magic Cauldron*. The game features all those well loved characters including Obelix, Getafix and of course Dogmatix. In this adventure you must aid Asterix and

## DATA STATEMENTS

Odin in their quest to find the missing pieces of the magic cauldron.

**FOURMARE**

*Snakebit: First Floor, 74 New Oxford Street, London WC1A 1PB. 071-240-8076.*

*Intergame: 01-294-0122.*

*Melbourne House: 66 High Street, Hampton Wick, Kingston, Surrey KT11 4JH. 01-942-9911.*

**New From Odin**

Odin tells Mission 69 as an arcade game with a purpose.

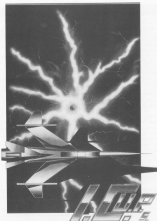
The player's aim is to annihilate the four opponents of a military weapons system (Mission 69) and in the process he goes through 12 levels, in and out of 200 rooms and eight different areas. It's available for the C64 and costs £9.99 on cassette and £14.99 on disk.

Also from Odin is *ICGTS - The International Commission for Universal Problem Solving*. The game begins in a space tunnel, at the controls of an interstellar scout ship. In each level, progress is hindered by several varieties of space ships, torpedo bombers and pursuit ships.

It's available on cassette and disk at £8.95 and £13.95 respectively.

**FOURMARE**

*Odin Graphics Limited: 071-76-6713.*

**Sport for All**

Mammoth has announced the release of *64th Man*, a judo program. Brian Jacks famous for his Olympic Judo prowess assisted in the writing of the game.

Large detailed character move, grip and hurl each other in animated sequences.

There are one or two player options, practice mode and special music and sound effects. It is £9.95 on C64 cassette and £12.95 on disk.

Sport on another planet is the subject of *Hawson's latest racing game, Alkyon* is by Ordium author Andrew Braybrook and features orbiters, diamond flyers, barrier pushers and the deadly kamikiller. Time trials, endurance races and

demolition derbies are all included. The game is £9.95 on cassette and £12.95 on disk.

*Football Manager*, addictive's golden oldie is back again in an updated format.

C64 and C16 versions will be available in new packaging and there is a free competition with every game. The prize is a day out at the FA Cup Final.

Still on the subject of football there is a new game from Scramaton, *The Double*, which again features the job of a football manager. It is designed to emulate as closely as possible the job of a real life manager. You start off as manager of a third division club and your objective is to take your squad to

## D A T A S T A T E M E N T S

the first division and the FA Cup Final. The first person to achieve the coveted double will be invited to meet Howard Kendall at Everton and will not a longer fixture at Goodison Park.

**FOUCAINE**

*Mastertronic: Mastertronic House, Bay  
Tennis, Premier Run, F. Simon  
85/14 AVE. 4271-062124  
Scannetec: 28 Trenchard Road,  
Weston-Super-Mare, Avon BS22 4JH.  
0634 23044  
Museum: Brown House, 36A Midway  
Fording Estate, Midway, Abingdon,  
Oxon OX14 4BN. 0235-822918.*

**CRL Latest**

CRL is bringing out three new games for the C64 and they couldn't be more in contrast.

*Bugsy* is a game from the ST Briles studio is about a gangster rabbit who turns up at the girl's school - £8.95 cassette and £12.95 disk.

*Cyborg* is a space age adventure and is £8.95 cassette and £14.95 disk.

*Devilade* is of course an adventure about that notorious vampire and is faithfully based on Bram Stoker's novel. It is a text/graphics adventure and features authentic sounding heartbeats and dripping blood. It's £7.95 on cassette and £12.95 on disk.

**FOUCAINE**

*CRL: CRL House, 9 King's Road,  
Carpenter's Road, London E17 2DT.  
01-925-5477.*

**General Products**

Integrity Solutions have decided to try and combat that not so age old problem of static effects on computers. Surveys have indicated that up to 70% of computer service calls are due to static electricity.

Integrity solutions has come up with the Static Buster to combat this problem. It diverts electricity from the screen, keyboard and operator. The Static Buster consists of a tiny unit with two leads, each with a pick up head which attaches to a screen a keyboard. A third lead attaches to an earth point with the unit acting like a static sponge and soaking up charges. The unit is priced at £49.95.

**FOUCAINE**

*Integrity Solutions: 304 Manchester  
Road, Rochdale, Lancs. OL11 3AH.  
0706-345831.*

**Gromlin Update**

Gromlin Graphics is another company which is storming in with new releases.

*Footballer of the Year* is being billed by Gromlin as a realistic football program.

You adopt the role of a professional footballer and at 17 you start your career in the fourth division. You have £500 in cash and 10 goal cards and your ambition is to be nominated footballer of the year. The game will be available on both the C16 and C64.

Gromlin is also bringing out compilation tapes of past hits which will comprise of two tapes packaged together containing two games each. The compilation will cost £9.95 and the C16 is a favoured machine for this release.

For the C64 there will be *Prince Knight* featuring Randolph, a hero who must rescue a beautiful maiden from the clutches of Spaghetti the terrible. Princess Amanda is a prisoner aboard the derelict space ship Rastbacker and there are 20 levels of Rastbacker security devices to negotiate before you can be reunited with her.

*Footballer* on the C64 is a space age racing game featuring an oversized football on an interstellar race track. Speed of motion are the essence in this game.



*Avenge* (Way of the Tiger II) is the first arcade/adventure in the Way of the Tiger series. In this game you are a Ninja warrior and have to avenge the death of your father Naigishi who was killed by Naomun. You will need all your skills when you enter the great keep to avenge Naigishi's death and recover the Scrolls of Kethuan.

**FOUCAINE**

*Gromlin Graphics: Alpha House, 10  
Curry Street, Salford S1 4PX.  
0742-713422.*



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# JACK THE NIPPER...

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believe yourself!

Carver I will name!

...& HERE WE ARE!

JUL MICRO

THE MICRO  
PROMPTER!

OH NO! NOT HIM AGAIN!

Oh-I had in Jack, the  
Nipper for me - or did!

...OR, SO THE STORY GOES - WE THINK!

AND SO... A STAR IS BORN.

I'm scaredicated!

And I always  
have a something  
time

We're a star!

FREE  
badge with  
every program!

Juste look  
what I can do!

Ha Ha!  
I'm a messenger  
maker

But ya can't  
stop me from  
prisoners

High freedom,  
they must think  
I'm a jolly!

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Alpha House, 30 Carver Street,  
Sheffield S1 4PS. Tel: (0742) 753423.  
Telex No: 347274



SPECTRUM-48K MSX AMSTRAD CBMG/128

ARE YOU TOO MUCH OF A WIMP TO PLAY THIS GAME

## GAME OF THE MONTH

## Trailblazer

*Ever fancied yourself as a football travelling along an interstellar bypass?  
You Have? Gremlin's latest masterpiece can  
help you realise your strange ambition.*

*By Stuart Cooke*

**I**f, like most people, you think that driving around a major city such as London in the rush hour is a little hair-raising then the latest release from Gremlin Graphics will have you thinking again.

It's not so much the fact that there are thousands of cars trying to reach the same destination (in fact there are only you and one opponent), it's the fact that the quality of the road is so poor. You could say it is fairly reminiscent of a Sunday drive around the M13.

Before I pass any further comments on the game I think a little scene setting is in order.

Imagine this. You are a football, yes I know that is hard to imagine but do try, travelling down an interstellar bypass. OK, so it is a little hard to imagine but I'm sure the bypass is interstellar since there seems to be no ground beneath it and all around are millions of stars.

The C64's screen is split into two sections. The top half of the screen being one player's view of his ball and the track ahead of it, the bottom half being the second player's view. As the game starts you soon realise that the road, bypass, course, call it what you will, is not all that it seems. As you watch the other player disappear off into the distance and you play-plus along more like a Morris-Minor than a football in outer space, certain things about the track become apparent. It is made up of multi-coloured squares.

So what do the squares do? Firstly I watched with horror as my poor little football disappeared into the void through a black hole. Thankfully it did return after a few moments, though a number of valuable seconds were wasted. Secondly, my ball, which was by now travelling at supersonic million miles per hour, was flung backward at an alarming rate of knots as it hit a purple square.

This is where I decided to find out what each of the squares do. I have already gone over the effects of the black and purple squares. The blue ones simply cause your ball to bounce, useful when your road suddenly disappears ahead of you. Red ones slow you down and green ones speed you up. If you are lucky (I'm enough to hit a white square then your ball shoots off down the track with a turbo boost, well at least until you fall down a hole which is bound to happen sooner or later. As for the pretty cyan ones, well I'll leave that for you to find out, though I must say they are extremely confusing.

Numerous playing options are included in the game. You can have a one or two player arcade game, where you must complete the course in a limited time. You are also only



given seven jumps which makes it even trickier. A one or two player trial game allows you to get used to the handling of your ball down a series of practice tracks and the final option allows you to race against a robot, which is not that easy to beat.

Controlling the game is extremely easy. Forward and Back to speed up and slow down. Left and Right to move across the track and fire to force your ball to jump. Getting your ball to land where you want is the major problem.

The graphics and sound are limited though adequate for the game. The scrolling playing area is detailed enough to let you see the obstacles in front of you as you career down the track, though I must admit, at top speed, by the time you realise a hole is coming up, you have generally fallen through it.

On second thoughts a Sunday drive around the M25 is a picnic compared to this game. Full speed ahead to your local computer shop and buy a copy. Mind you watch your TV screen, after a few hours playing this game you'll be just about ready to put your joystick through it.

#### Traillblazer

Name: Trailblazer, Price: £9.95, Machine: C64, Supplier: Gremlin Graphics, Alpha House, 10 Carter Street, Sheffield S1 4PS. Tel: (0742) 753428.  
Originator: BB/TL Graphics/B/TB, Playability: BB/TL, Value: BB/TL.

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*"It's like a whole of movie director in diamond plateaus in deep space - some things are happenings again."* John Legend

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# Write On

*Eric Doyle looks at the Script/Plus cartridge which could vastly improve your wordpro powers.*

A wordprocessor for the Plus/4 may seem like a strange concept when there's already one in there and the C-16 must surely be too small. Why then is Parsoft trying to market the Script/Plus cartridge?

The short answer is that this package has to be seen to be believed. In one small cartridge is packed the very popular Easywrite wordproc with whiskies and bells attached. It boasts the on-board software in the Plus/4 hands down and turns the C-16 into a very useful writing implement.

All the major functions of a wordproc are here. Block move and erase, text search and replace, variable margins, dual printout preview and disk/commode options are just some of the standard options. Added to this is the ability to use mail merge techniques to create individualised standard letters, a simple calculator and even-Commodore printer commands.

Once the cartridge is plugged in, it is called up by pressing the F3 key and RETURN. After choosing your options for size/line drivers, screen display size and printer type, the screen changes to show a reversed command line at the top with 24 lines for text. As the text is entered the screen scrolls to the right if your selected width is greater than 40 and upwards as you fill all of the lines available in memory. On the Plus/4 you have 241 lines of text in 40 column mode or 83 lines in 240 mode. On the C-16 this reduces to 91 lines or 15 lines respectively. Obviously the restriction on the C-16 limits its use to letter writing unless you use several linked files to build up a more substantial document.

Formatting commands are embedded into the text and are denoted by a reversed asterisk. A very useful addition to the normal margins and page length settings is the ability to place fixed headers and footers on each page automatically. As the names

suggest headers are at the top of each page and footers at the bottom. As their simplest these might be automatically increased page numbers placed at the left, centre or right of the line. Where a more professional finish is required it is possible to have a document name, chapter heading and page number displayed at the top of text page number displayed at the top or bottom (or both) of each page as it is printed out.

To select a special option such as load, save or search and replace, the ESCape key is used to switch from text mode to command mode and then a letter key will place you in the correct mode with a suitable phrase displayed on the command line to confirm your choice. The key is depressed usually the first letter of the required command. To save you having to search the house for your manual every time you need to access a little used special function, the F7 key will bring up a series of HELP screens which summarise all of the commands.

All of the function keys have predefined functions which can save a lot of messing about when you want to access commonly used commands such as load, save or to display the text on the screen in the way it will appear on the printer. Unfortunately the keys cannot be redefined to suit your own requirements.

Disk users can rest in a superb disk support system. All of the usual functions such as search and rename are accessible but use the old DOS format which are detailed in the substantial manual which accompanies the cartridge. As well as the disk command which allows you to call up the directory at any time, a variant of this is included which lists all of the Script/Plus files on a disk and then allows you to select the one which you want to load.

Incidentally, the C-16 Script/Plus

file would have reached capacity during the last paragraph.

By far the most powerful facility is the ability to create a series of linked files. Often a document will not fit into the available memory, especially on the C-16. When this occurs it is possible to set a command at the end of the first section to say that there is going to be a second file. The first file is saved and the memory cleared for the entry of the second part of the document. This may be repeated from file to file until full document is on disk in as many parts as necessary. When printing out you tell the computer to expect a string of linked files and each will be loaded and printed in turn.

Another benefit is when you discover that a word needs changing in a completed document. This word may occur in several of the linked files but presents no problem to the program. Using the search and replace function, the computer will start at the first file and work its way through all of the linked files changing the word according to your needs.

In the space of a review I can only nibble away at this tasty model. The manual contains over 120 pages detailing all of the functions available. If you frequently use the wordprocessor on your Plus/4 or if you own a C-16 and need a wordprocessor, then save up your pennies for this package. Script/Plus is not only the most powerful wordprocessor for the C-16/Plus/4 but also ranks highly in comparison to wordprocessors on any other computer.

As a guide to the space available in the Plus/4, I've reached the end of the document and my command line tells me I've used just under 150 lines of my allowed 241.

#### Touchline:

**Parsoft:** 9 Fort Terrace, Worcester Park, Surrey KT4 5ZG 01 330 0811.

**Price:** £119.95

# Into the Eighties

*Are you fed up of enduring your C64's 40-column screen? This program should bring you into the Eighties in a flash*

*By S.J. Chance*

A few weeks ago an actress-friend of mine came round to borrow my typewriter. She wanted to produce a page of quotes from her recent "rave reviews" to send to prospective employers. Several screenwrecks short of A4 linen, I went out for an emergency supply of correction fluid.

This still didn't make the going too heavy, so I volunteered to "word-process" it on my 64. She (my actress friend that is, my 64 has yet to deserve that particular pronoun), wanted the screen presented in a newspaper format, with different sized columns and blocks all over the place. Trying to do this in 70 columns width on a 40 column screen was rather more complicated than I had anticipated, the text rapidly forming a lacy-looking tangle of bits of different sentences. In the end we gave up. My actress has not been to see me since.

"Oh, for an 80 column display mode!" I thought. "Perhaps I can write a sub-routine that will create one."

I started with a simple routine for plotting user-defined characters on to the hi-res screen. It was then necessary to reproduce all the cursor routines of the normal text screen, but manipulating eight times as much data. This was further complicated by

the structure of the screen itself. The hi-res screen consists of "character positions" of eight bytes, forming forty 1 x 8 grids across the screen. To achieve 80 character positions, each 8 x 8 grid would have to contain two characters. This demanded much ANDing, ORing, ROLing and RORing.

Once you have successfully RUN the loader program, the sub-routine can be initialised by SYS 49769. You should now find yourself looking at the 80-column screen, blank except for the "READY" prompt, written in tiny-wiggly-letters in the top-left hand corner.

If you now type "LIST", the first thing you will notice is that the word does not appear on the 80 column screen. However, when RETURN is pressed, the program lists in the usual way. This is where you will discover the limitations of the resolution of the T.V. or monitor you are using. Having only a humble black and white portable, I find the text quite readable. If you are using a colour television, it may help if you de-tune the channel you are using to black and white.

The F8 key will toggle back to the normal text screen, where you may like to enter these lines of Basic:

```
10 GET AS: IF AS="" GOTO 10
```

```
20 PRINT AS: GOTO 10
```

If you RUN this, any characters you enter will now be output to both the 40 and 80 column screens. This includes changes in colour, but with the limitation that each nibble of fore-ground colour has to serve two characters. For this reason, INSERT and DELETE do not scroll the colour memory as they do on the normal text screen.

The character set was originally more convoluted, but I found that squaring-up the corners and avoiding diagonal lines produced a far better image. As 80COL is intended for word-processing, most graphics characters would be redundant; thus when they are encountered, the default character of a reverse-space is printed. If you wish to experiment with the character set, the relevant DATA begins with the four double-quotes in line 375.

The program occupies memory from 9C27B to 9C3FF. Colour memory starts at 9C00B, and the hi-res screen uses the RAM behind the KERNAL ROM at 8000B. The sub-routine is wedged into the operating system via the CHROUT vector at 8026.

Perhaps next time one of your friends needs a favour, you'll fare rather better than I did! 79

PROGRAM: 80 COLUMN

Please read "LISTINGS" before printing program.		D,81,FB,AB,FB,80,8B,80,00,86 FC,00,0F,0A,04,80,3187	E,80,0A,AB,87,02,0A,80,80,02 0A,8A,00,82,82,82,2748
36	18 FORM-STO10-C-4 FORM-STO2 1	180 DATA 8A,7B,0A,00,8A,70,4A C,7B,CA,8B,80,80,87,00,8B,00 8A,00,0A,0A,0A,8B,204A	81 180 DATA 80,80,80,80,8A,8B,8A D,8A,00,80,87,00,8D,8A,00,8B 8B,03,0A,00,8B,8A,8A
37	18 FORM-STO10-C-4 FORM-STO2 2	180 DATA 8A,00,8A,00,80,8A,00 1,8A,00,8B,8A,00,80,80,80 80,00,1B,8A,03,8B,2121	82 180 DATA 8A,00,8A,00,8A,00,8A F C,1B,0B,80,80,8A,8B,02,8B,0B 80,00,1B,8A,03,8B,2121
38	18 FORM-STO10-C-4 FORM-STO2 3	180 DATA 8A,00,8A,00,80,8A,00 F 8,8A,8B,87,0A,FC,8A,FC,80,87 00,80,FB,8B,8A,00,304A	83 180 DATA 8A,00,8A,00,8A,00,8A F 8,8A,8B,87,0A,FC,8A,FC,80,87 00,80,FB,8B,8A,00,304A
39	18 FORM-STO10-C-4 FORM-STO2 4	180 DATA 8A,00,8A,00,80,8A,00 F 8,8A,8B,87,0A,FC,8A,FC,80,87 00,80,FB,8B,8A,00,304A	84 180 DATA 8A,00,8A,00,8A,00,8A F 8,8A,8B,87,0A,FC,8A,FC,80,87 00,80,FB,8B,8A,00,304A
40	18 FORM-STO10-C-4 FORM-STO2 5	180 DATA 8A,00,8A,00,80,8A,00 F 8,8A,8B,87,0A,FC,8A,FC,80,87 00,80,FB,8B,8A,00,304A	85 180 DATA 8A,00,8A,00,8A,00,8A F 8,8A,8B,87,0A,FC,8A,FC,80,87 00,80,FB,8B,8A,00,304A
41	18 FORM-STO10-C-4 FORM-STO2 6	180 DATA 8A,00,8A,00,80,8A,00 F 8,8A,8B,87,0A,FC,8A,FC,80,87 00,80,FB,8B,8A,00,304A	86 180 DATA 8A,00,8A,00,8A,00,8A F 8,8A,8B,87,0A,FC,8A,FC,80,87 00,80,FB,8B,8A,00,304A
42	18 FORM-STO10-C-4 FORM-STO2 7	180 DATA 8A,00,8A,00,80,8A,00 F 8,8A,8B,87,0A,FC,8A,FC,80,87 00,80,FB,8B,8A,00,304A	87 180 DATA 8A,00,8A,00,8A,00,8A F 8,8A,8B,87,0A,FC,8A,FC,80,87 00,80,FB,8B,8A,00,304A
43	18 FORM-STO10-C-4 FORM-STO2 8	180 DATA 8A,00,8A,00,80,8A,00 F 8,8A,8B,87,0A,FC,8A,FC,80,87 00,80,FB,8B,8A,00,304A	88 180 DATA 8A,00,8A,00,8A,00,8A F 8,8A,8B,87,0A,FC,8A,FC,80,87 00,80,FB,8B,8A,00,304A
44	18 FORM-STO10-C-4 FORM-STO2 9	180 DATA 8A,00,8A,00,80,8A,00 F 8,8A,8B,87,0A,FC,8A,FC,80,87 00,80,FB,8B,8A,00,304A	89 180 DATA 8A,00,8A,00,8A,00,8A F 8,8A,8B,87,0A,FC,8A,FC,80,87 00,80,FB,8B,8A,00,304A
45	18 FORM-STO10-C-4 FORM-STO2 10	180 DATA 8A,00,8A,00,80,8A,00 F 8,8A,8B,87,0A,FC,8A,FC,80,87 00,80,FB,8B,8A,00,304A	90 180 DATA 8A,00,8A,00,8A,00,8A F 8,8A,8B,87,0A,FC,8A,FC,80,87 00,80,FB,8B,8A,00,304A
46	18 FORM-STO10-C-4 FORM-STO2 11	180 DATA 8A,00,8A,00,80,8A,00 F 8,8A,8B,87,0A,FC,8A,FC,80,87 00,80,FB,8B,8A,00,304A	91 180 DATA 8A,00,8A,00,8A,00,8A F 8,8A,8B,87,0A,FC,8A,FC,80,87 00,80,FB,8B,8A,00,304A
47	18 FORM-STO10-C-4 FORM-STO2 12	180 DATA 8A,00,8A,00,80,8A,00 F 8,8A,8B,87,0A,FC,8A,FC,80,87 00,80,FB,8B,8A,00,304A	92 180 DATA 8A,00,8A,00,8A,00,8A F 8,8A,8B,87,0A,FC,8A,FC,80,87 00,80,FB,8B,8A,00,304A
48	18 FORM-STO10-C-4 FORM-STO2 13	180 DATA 8A,00,8A,00,80,8A,00 F 8,8A,8B,87,0A,FC,8A,FC,80,87 00,80,FB,8B,8A,00,304A	93 180 DATA 8A,00,8A,00,8A,00,8A F 8,8A,8B,87,0A,FC,8A,FC,80,87 00,80,FB,8B,8A,00,304A
49	18 FORM-STO10-C-4 FORM-STO2 14	180 DATA 8A,00,8A,00,80,8A,00 F 8,8A,8B,87,0A,FC,8A,FC,80,87 00,80,FB,8B,8A,00,304A	94 180 DATA 8A,00,8A,00,8A,00,8A F 8,8A,8B,87,0A,FC,8A,FC,80,87 00,80,FB,8B,8A,00,304A
50	18 FORM-STO10-C-4 FORM-STO2 15	180 DATA 8A,00,8A,00,80,8A,00 F 8,8A,8B,87,0A,FC,8A,FC,80,87 00,80,FB,8B,8A,00,304A	95 180 DATA 8A,00,8A,00,8A,00,8A F 8,8A,8B,87,0A,FC,8A,FC,80,87 00,80,FB,8B,8A,00,304A
51	18 FORM-STO10-C-4 FORM-STO2 16	180 DATA 8A,00,8A,00,80,8A,00 F 8,8A,8B,87,0A,FC,8A,FC,80,87 00,80,FB,8B,8A,00,304A	96 180 DATA 8A,00,8A,00,8A,00,8A F 8,8A,8B,87,0A,FC,8A,FC,80,87 00,80,FB,8B,8A,00,304A
52	18 FORM-STO10-C-4 FORM-STO2 17	180 DATA 8A,00,8A,00,80,8A,00 F 8,8A,8B,87,0A,FC,8A,FC,80,87 00,80,FB,8B,8A,00,304A	97 180 DATA 8A,00,8A,00,8A,00,8A F 8,8A,8B,87,0A,FC,8A,FC,80,87 00,80,FB,8B,8A,00,304A
53	18 FORM-STO10-C-4 FORM-STO2 18	180 DATA 8A,00,8A,00,80,8A,00 F 8,8A,8B,87,0A,FC,8A,FC,80,87 00,80,FB,8B,8A,00,304A	98 180 DATA 8A,00,8A,00,8A,00,8A F 8,8A,8B,87,0A,FC,8A,FC,80,87 00,80,FB,8B,8A,00,304A
54	18 FORM-STO10-C-4 FORM-STO2 19	180 DATA 8A,00,8A,00,80,8A,00 F 8,8A,8B,87,0A,FC,8A,FC,80,87 00,80,FB,8B,8A,00,304A	99 180 DATA 8A,00,8A,00,8A,00,8A F 8,8A,8B,87,0A,FC,8A,FC,80,87 00,80,FB,8B,8A,00,304A
55	18 FORM-STO10-C-4 FORM-STO2 20	180 DATA 8A,00,8A,00,80,8A,00 F 8,8A,8B,87,0A,FC,8A,FC,80,87 00,80,FB,8B,8A,00,304A	100 180 DATA 8A,00,8A,00,8A,00,8A F 8,8A,8B,87,0A,FC,8A,FC,80,87 00,80,FB,8B,8A,00,304A

D,49,00,89,81,87,AD,AB,00,80	708,05,89,80,80,AD,2998	05	700 DATA 00,44,12,48,00,10,0
81,81,30,74,74,00,7407	515 DATA 00,74,70,74,70,74	06	0,70,70,00,84,70,74,00,74,12
78 440 DATA 00,00,80,80,80,80,80	1,80,14,78,78,78,80,AD,00,78	07	00,00,80,80,80,80,1400
1,00,80,80,80,80,80,80,80,80	78,74,AD,AD,1,00,78,7407	08	740 DATA 00,70,70,70,68,70,70
81,AD,80,80,80,80,80,80,80	515 DATA 60,80,00,AD,AD,80,2	09	3,70,00,74,AD,70,11,70,80,80
17 441 DATA 00,AD,AD,80,80,78,AD	7,80,00,00,78,70,00,AD,00,80	10	80,70,74,70,80,AD,1807
D,AD,80,80,70,AD,00,80,AD,80	00,00,AD,78,00,AD,00,78,00	11	480 DATA 00,AD,00,33,74,13,AD
AD,00,80,80,80,AD,00,AD,AD	0,80,00,AD,00,80,80,80,80,80	12	4,78,80,80,00,33,33,30,30,30
20 470 DATA AD,00,78,80,81,78,80	0,80,00,AD,00,78,AD,00,80	13	00,74,AD,34,80,00,1847
8,AD,80,70,80,70,78,81,78,18	AD,00,AD,00,78,AD,00,80	14	800 DATA 44,44,44,44,00,99,9
74 470 DATA 00,AD,80,80,00,AD,8	440 DATA 00,30,00,30,00,70,0	15	9,90,00,70,70,50,00,70,70,70
8,AD,80,80,AD,AD,00,70,78,AD	2,80,13,78,80,80,00,AD,AD,80	16	00,70,70,74,80,00,1307
AD,00,80,80,80,AD,00,78,AD	AD,80,AD,80,00,80,1800	17	810 DATA 00,70,00,74,AD,AD,00
06 480 DATA 00,00,80,80,00,18,AD	180 DATA 00,80,AD,00,AD,0	18	0,70,70,70,AD,80,AD,00,80,50
3,78,80,80,80,80,80,80,80,00	2,AD,AD,AD,00,78,78,78,AD,00	19	0,70,70,70,70,70,70,1847
81,70,AD,78,78,AD,AD,1807	35,70,AD,AD,AD,80,2,1107	20	810 DATA 00,AD,80,80,00,70,3
73 480 DATA 00,80,80,AD,AD,00,8	0,AD,00,80,80,80,AD,00,80	21	9,AD,AD,50,50,AD,1847
8,00,80,00,AD,AD,80,70,11,AD	80,80,00,AD,00,80,AD,AD	22	820 DATA 44,80,70,70,70,70,0
AD,00,80,78,78,AD,80,1098	515 DATA 84,00,80,80,70,14,1	23	2,70,70,70,00,AD,44,80,80,80
44 490 DATA 00,80,78,78,AD,80,3	8,AD,AD,00,80,80,AD,AD,80,80	24	80,AD,30,70,70,80,1000
8,78,70,78,80,80,78,80,AD,80	84,AD,AD,AD,AD,AD,AD,AD	25	830 DATA 00,70,80,80,70,80,0
81,AD,80,80,AD,80,80,80,80	500 DATA 00,AD,1,64,80,AD,0	26	5,70,80,50,50,50,50,74,80,0
18 490 DATA 78,80,81,00,80,70,0	1,00,AD,90,84,00,AD,00,00,70	27	70,AD,00,70,70,70,70,1847
0,AD,00,00,00,80,80,80,AD,00	80,81,70,80,00,00,00,00	28	840 DATA 00,70,70,70,70,70,70
00,AD,AD,00,70,80,AD,00,00	545 DATA 00,00,00,80,80,AD,0	29	2,00,70,70,70,70,70,80,80,80
20 500 DATA 84,78,80,80,00,70,0	4,AD,70,80,80,80,50,70,70,50	30	80,AD,44,44,44,70,1810
70,70,00,80,80,00,AD,00,80,80	70,AD,70,80,84,74,1807	31	850 DATA 44,99,80,80,70,AD,0
40 500 DATA 80,80,AD,AD,AD,80,7	500 DATA AD,50,84,84,80,70,3	32	8,80,70,50,50,50,50,70,70,80
0,AD,00,AD,00,AD,80,74,AD,AD	4,00,00,00,10,AD,AD,21,AD,11	33	10,50,50,50,70,70,70,1000
00,70,80,80,00,AD,AD,00,00	1,74,00,44,74,70,1814	34	860 DATA 00,70,70,70,70,70,70
00 510 DATA 80,80,70,80,00,AD,0	575 DATA 00,00,00,00,80,80,8	35	2,00,70,70,70,70,70,70,70,70
AD,00,00,AD,80,78,AD,AD,80	1,34,00,00,00,00,00,00,00,AD	36	10,70,70,70,70,70,70,70,70
78,AD,AD,AD,AD,AD,AD,AD,AD	11,00,AD,AD,AD,AD,80,78	37	870 DATA 00,70,70,70,70,70,70
74 510 DATA 40,00,70,80,80,AD,0	180 DATA 70,00,00,00,00,00,00	38	2,00,70,70,70,70,70,70,70,70
0,80,AD,AD,00,AD,00,80,AD,80	9,12,AD,80,70,00,10,AD,11,70	39	AD,AD,AD,AD,AD,AD,AD,AD,AD
AD,AD,AD,AD,AD,AD,AD,AD,AD	80,00,74,AD,10,80,1800	40	AD,AD,AD,AD,AD,AD,AD,AD,AD
15 520 DATA 00,AD,AD,AD,70,80,AD	585 DATA 10,AD,AD,AD,70,70,AD		7,70,70,70,70,70,70,70,70,70
0,80,00,AD,00,AD,AD,00,AD,AD	4,AD,AD,78,78,80,AD,00,12,AD		00,00,80,80,00,00,00,00,00
	80,AD,AD,AD,AD,AD,AD,AD,AD		

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### By Smart Cooks

If you have ever come across Friedman's superb Supertraps 64 then you will be used to the type of menu presented. For the uninitiated, the screen consists of a number of words at the top of the screen. Choosing the required option is simply a matter of highlighting the correct option and selecting it. If this command has further options stored 'beneath' it, then these are shown and you can choose from these as required. This makes the program extremely user friendly, as you never have to remember any of the commands yourself, simply follow through the menu until the command you want

The documentation supplied with the program is then described as sparse but adequate. A small tutorial takes you through simple operations such as examining a file that is stored on disk and how to alter a disk directory. I can't help thinking that a more detailed description on the exact format of the data stored on a disk and what it all means would have been very helpful, to beginners especially but also to hardened programmers as a sort of reference guide. To be fair the 'Tutorial' does give a little bit of the information required and should be enough to get most people started.

The first command available is "DISK". This is the menu for disk utilities. Upon selecting this a sub menu appears offering you the options of:



**Drive** - which allows you to change the drive you are working on.

**Unit** - this lets you change the device that you are working on (R.S. etc.).

**Report** - this checks a whole disk for errors, output is to either screen or printer.

**Change** - to tell *DiskMate* that you are removing the disk.

**LOG** - displays a directory of the disk giving the size of the file, the track and sector of the first block of the file. If the file is a PPSD file then the start address is given. In fact all of the information that you would ever require.

**Hint** - searches the disk for the occurrence of a string of characters.

**Memory** - allows you to examine and change data held in the disk drives internal memory.

**Sort** - allows you to alter the order of the files on a disk.

**GO** - reads into the buffer either the first sector of the disk directory, the BAM or the header.

**Init** - allows you to select whether the disk is initialised before the first operation.

**Name** - allows you to change the disk name.

**Validate** - tells up your disk directory as the normal disk "V" command.

One command has been omitted from the above list. This is the BAM command. Upon selection of this a further menu is selected that allows you to Display and Print the disk BAM, Allocate and free blocks and to check specific blocks. In case you are new to the term BAM the letters simply stand for Block Availability Map. It is from this area in the disk that the drive is able to discover which areas on the disk have been used. Setting blocks yourself means that you prevent the disk from using the specified area of the disk.

As you can see the range of disk oriented commands is quite formidable, and we've only taken a look at the first menu option.

Next on our list is the file command. Selecting this command brings up a menu of commands that allow you to carry out operations on specific files on the disk. Again a list of functions is the best way to illustrate this.

**Find** - reads the first sector of the specified disk file into memory.

**Chain** - this command lists all sectors belonging to a specific file. A program is stored in more than one place on a disk and this is your way of finding where.

**Start** - moves back to the start of the file found with the Find option above.

**Hint** - allows you to search through a specified file for all occurrences of a specified string of data.

**Lock** - Commodore disk drives allow you to write protect a program on a disk so that you can't scratch it, rename it etc. Unfortunately protecting a file is quite difficult. This command makes it child's play.

**Unlock** - the opposite to the above.

**Erase** - deletes any unwanted files from disk.

**Recover** - we have all deleted files from a disk accidentally. This option tries to recover any erased file from the disk.

**Interpret** - this allows you to display disk data as Text, Basic, 6502 assembly code or as screen code.

Extremely useful if you are trying to debugable programs from disk.

**Verify** - checks that every file in the disk directory has the same number of blocks as shown in the directory, the readability of the file is also checked.

**Display** - allows you to look at the contents of any record stored in a REL file.

Going back to the main menu we have the commands Track and Sector which allow you to specify which track and sector you wish to look at. Read simply reads the selected sector into the buffer while 'write' writes the buffer to the specified area on disk - carefully with this one as you can cause all sorts of damage if you don't know what you are doing.

I have already mentioned that it is possible to change the contents of the buffer. The Edit function allows you to do this. Data is entered by entering either ASCII characters or hexadecimal values. All operations are carried out in a large editing area with the cursor keys to help you move around. Once you have made changes (or not) you can get a permanent

record of the sector on your printer with the print command.

Easy movement around the disk is catered for by the 'next' and 'last' commands. 'next' simply looks at the sector you are working on to find out where the next sector linked with it is stored and moves you to it. *Super DiskMate* stores a list of the last 256 sectors that you have looked at, 'last' simply looks up the last sector from the list and moves you there.

The final option is similar to the file interpret command. The only difference being that this time the program does not follow the file through.

## Verdict

*Super DiskMate* contains within it the widest range of disk orientated commands that I have come across in one place. Sure, there are programs around that do similar things but the sheer complexity and range given by this program is unsurpassed. The program is superbly presented and the menu system makes it extremely easy to use.

You probably have a stock of clonotypes in your home just in case you happen to cut your finger. If you are serious about the use of your disk drive and the data you store, it's probably a good idea to buy a copy of this program now, just in case you corrupt your disk. You may not need it now, but wouldn't it be nice to know it's always there? **EE**

## Tonkiller

Name: *Super DiskMate*,  
Machine: Plus/4, C64, C128, Commodore 486K, 68000, 720/80128 + most disk drives. Supplier: Perfection Software Ltd, 4 Park Terrace, Worcester Park, Surrey, E4 3LE. Tel: 81-538 7166.

# Disk Utility

*Disk Drive owners shouldn't be without this comprehensive range of utilities from Paul Eves.*

When Commodore designed the 1541, they gave it quite a complex range of built-in instructions. However they did make it quite difficult to use them. This utility, given away FREE, with this issue of Four Commodore will make accessing your disk drive extremely easy.

Not only are the standard commands made easier to access, but a plethora of new and extremely powerful utilities have been added. For example you can now find the start address of any program or check a disk for errors.

The whole program is menu driven and extremely easy to use. Simply LOAD the program from cassette and it will automatically start. If you should want to SAVE it onto your own disk then you should press RUN/STOP and RESTORE to return to Basic, then simply SAVE it to tape or disk as you would a normal program.

When the program starts you will be asked if you want to change the colours of the screen. Once you have done this you will go to the main menu. Figure 1 shows all of the available functions, we will deal with each one in turn.

## A) Alter Start Addr

As you are no doubt aware when you store a file to disk its load address is saved with the file. This function allows you to change this address so that it will LOAD at any address that you wish.

## B) Convert Number

When dealing with disk programs, especially machine code, it is quite often necessary to change numbers from one base to another. This

function will allow you to perform any of the following number conversions:

Hex to Decimal  
Decimal to Hex  
Binary to Decimal  
Decimal to Binary

## C) M/C Data Maker

This function will allow you to turn any machine code file that is on disk into a Basic Loader. Each byte of the specified file is read from disk and added to a basic data statement. Once the program has been converted a loader is added to the start of the Data and the program is saved to disk.

## D) Directory Commands

This option brings up a second menu in which there are a number of extremely useful commands for handling your disk directories. Options available are:

S - List directory to screen.

This prints out a list of all programs on a disk onto the screen.

L - List directory to the printer.

This does the same as the above, however, the list is sent to the Printer. A Commodore printer is assumed.

N - Write invisible directory to disk

This command alters your disk directory in such a way that you can no longer read the directory. All of the programs can still be LOADED. This is an excellent way to protect your programs from prying eyes.

E - Write no directory load to disk.

This command has a similar result to the above. However, instead of making an invisible directory it will prevent anyone from LOADING the directory into the computer.

P - Protect files against scratching.

## AN ESP PRODUCTION

WRITTEN & PROGRAMMED BY P.A. EVES  
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A) ALT START ADDR	G) FILE CATALOG
B) CONVERT NUMBER	H) I.D. CHECKER
C) M/C DATA MAKER	I) LOAD ADDRESS
D) DIRECTORY CHGS	J) FILE SCRATCH
E) DISK CHECKER	K) F. UNSCRATCH
F) ERROR CHECKER	L) M/P DISKETTE
M) DISK COMMANDS AND APPEND FILES	



With the Commodore disk drive it is possible to protect files against erasure. Any non-deletable files can be seen in the directory with a 'c' beside the file type. Unfortunately Commodore made no provision for you to use this facility easily, this option corrects that omission.

#### I - read and change disk header or ID

This command is extremely useful as it allows you to change the name of any disk and its ID. You are probably aware that all of your disks should have a different ID. If you accidentally formatted one with an ID that you had already used you can change it with this command. This saves copying all of the files and re-formatting the disk.

The final option on this menu is 'Q' which will take you back to the main menu.

#### E) Error checker

If you should have a disk that you suspect an error may be on then you can use this command to find out if any specified track has an error on it. The type of error, if found, will be reported then you can try to fix it with a disk monitor etc.

#### F) Disk Checker

This option is similar to the above except that it checks the whole disk rather than asking for specific tracks.

#### G) File catalog

You may think that this command is similar to the one in directory

commands. It does however give you more information.

When you perform this operation on a disk all files on the disk will be listed together with their start and end addresses.

#### H) I.D.Checker

No doubt at some time you will have come across files on a disk that simply refuse to LOAD. Quite often the cause for this is that the ID on the track has somehow become different from that in the ID of the DISK. This command allows you to check the ID in all sectors of a specified track. Once you have found your error you can correct it with a disk editor.

#### I) Load Address

This function will print out the load address of a specified program. This is extremely useful when used in conjunction with menu option A as you can find out where a program LOADS, change it and then check it to see if the change has been made correctly.

#### J) File Scratch

Option J allows you to delete specified files from disk. It is similar to the standard disk 'X' command but is much easier to use.

#### K) F.Unscratch

This is the File Unscratch command. When you erase a file from disk the actual file is not deleted it is only

marked as being so. With this command it is possible to re-junkmate any file that has been accidentally deleted. NOTE this command will probably not work if you have SAVEd something to the disk since the scratch.

#### L) W/P Disk

This command will make any disk write protect. This command will only work with the 1541 disk drive. The write protect is done through software and a write protect tab isn't needed. However please note that you cannot change this disk back into one that you can write to after this command.

#### \* ) Disk Commands

This function allows you to use any of the standard disk commands (d,e,s etc.). If you don't know how to use them then we suggest that you refer to your disk drive manual. \*\*

#### Warning

As you can see this set of utilities is extremely powerful. If you use any of the commands without thinking then you could possibly damage the disk that you are operating on and be unable to recover the data. We therefore strongly suggest that you back up any disk that you intend to use this program on just in case you use the wrong command.

- [S] - LIST DIRECTORY TO THE SCREEN**
- [L] - LIST DIRECTORY TO THE PRINTER**
- [W] - WRITE INVISIBLE DIRECTORY TO DISK**
- [X] - WRITE A NO DIRECTORY LOAD TO DISK**
- [P] - PROTECT FILES AGAINST SCRATCHING**
- [U] - READ AND CHANGE DISK HEADER OR ID**
- [Q] - RETURN TO MAIN MENU**

# Getting it Together

*If you're thinking about buying an assembler then you're probably mystified by the wide choice. Look no further to see the light.*

*By Allen Webb*

Many of you will be contemplating or already making the move from Basic to machine code. This move can be both fun and rewarding however a lot hinges on your choice of assembler. The idea behind this article is to describe in some detail the serious assemblers around and help you in your search.

## What is an Assembler?

Before launching forth, it is worthwhile considering what an assembler is and what it does.

Because we stupid humans find it difficult to write machine-code directly in the form understood by the machine, we use assemblers to allow the creation of an intelligible source code. We then use an assembler to convert the source code into object code directly usable by the machine. In order to maximize the ease of creating the source code, good quality assemblers allow you to use labels to identify variables, addresses, data tables and the destination of loops and jumps. Those of you who write complex programs will appreciate the importance of a structured approach to allow ease of understanding the workings of the program. It is particularly vital if you want to make the code intelligible to other programmers. Languages such as PASCAL allow such a sensible approach. When using machine code, the use of labels and remarks are even more important. Program 1 is a simple example of source code showing the features offered by most decent assemblers.

Hopefully you will find this example easy to follow. Since most

```

PROGRAM 1
10 10 = 0000
20 REMARKS = 0000
30 10000000 = 0000
40 10000000 = 0000
50 10000000 = 0000
60 10000000 = 0000
70 10000000 = 0000
80 10000000 = 0000
90 10000000 = 0000
100 10000000 = 0000
110 10000000 = 0000
120 10000000 = 0000
130 10000000 = 0000
140 10000000 = 0000
150 10000000 = 0000
160 10000000 = 0000
170 10000000 = 0000
180 10000000 = 0000
190 10000000 = 0000
200 10000000 = 0000

```

decent assemblers allow the use of linked source files (more on that later), you can be as liberal with labels and remarks as you like. This is a powerful aid since it encourages a systematic modular approach to machine code.

Since the task of translating these labels requires some work, such assemblers use two or more "passes" to perform the translation. Such facilities are a must for any decent assembler.

Before I describe the better assemblers about, I want to discuss the features that you should check when deciding which package to go for.

## Essential features

1) The assembler must be in machine code. No I'm not a machine code snob, but if you want to assemble a decent sized piece of code, a Basic assembler will be much too slow.

2) Most offer full labels of at least six characters in length. As indicated in the example above, it's desirable to be

able to use meaningful labels. Six characters is, in my opinion, the minimum acceptable.

3) Should support linked source files to allow the assembly of very large programs. Source codes are generally memory hungry with about 30K of source code needed for 4K of object code. If you're writing a 50K mega game, the combined source code will be pretty large. Any decent assembler will allow you to split the source code into several linked sections and assemble it in this form.

4) Should provide a symbol table or cross referencing option. This is extremely handy when debugging since you may want to locate the address of a loop or routine.

5) Should provide output to printer, preferably with formatting options. Again, a hard copy is a great debugging aid.

6) Should provide 'toolkit' commands to allow remembering etc. of the source code. One important area to check is the editor used for the creation of the source code. Many assemblers use the 64's editor. This is OK but not much use on its own. Other assemblers have their own operating system and editor. These tend to be more versatile.

The commands to look for as a minimum are FIND, REMINDER, DELETE, AUTO (line numbering).

7) Should offer disassembly and some form of debugging system. You should ensure that there is a monitor in the system. This is vital for the manipulation of code. Single step execution is a useful debugging aid. The ability to disassemble the code is valuable as a check of the object code.

8) Should provide pseudo op-codes to allow the creation of data tables.

Nearly all code will need data tables. This may comprise of straight numeric data or text. The assembler should provide pseudo op-codes for single data bytes, double data words and text as ASCII codes or Commodore screen codes.

## Optional features

1) macros - handy if you want to set up a library of routines but otherwise, in my view, of limited value.

2) Conditional assembly - saves time but seems to be more of a case of a solution searching for a problem.

So what is there on the market? I've looked at a wide range of assemblers and have compared them in Table 1.

	LET	PUB	MINI	LAZER	MC	ZEUS	MACROS	HELP	MON-64
TYPE	C	C	64/78	78	78	C	C	C	C
EDITOR	YES	YES	YES	YES	YES	YES	YES	YES	YES
DEBUG	YES	NO	YES	NO	NO	NO	NO	YES	YES
TEST/VERIFY	NO	?	YES	NO	NO	NO	NO	?	?
DISASSEMBLER	NO	YES	YES	YES	YES	YES	YES	YES	YES
MACROS	+	+	+	+	+	+	+	+	+
SCREEN CURS	18	0	4	0	0	0	0	0	0
LIST FILES	YES	YES	YES	NO	NO	NO	NO	NO	NO
FORMAL TABLE	YES	YES	YES	NO	YES	YES	NO	NO	NO
LAZER, LAZER II	0	?	0	0	0	0	0	0	0
CODE	15.95		25.95						14.95

## Notes for Table 1

Desktop, C=cartridge, C=cassette.

2) I could not ascertain the maximum label length for MINIB but I do know that it will accept at least six characters.

3) Some categories have stars showing the extent of facilities roughly they mean:

• = minimum acceptable

\*\* = good enough

\*\*\* = couldn't ask for more.

## Assembler Monitor 64

As in the case with most of First Publishing's products, this package is of German origin. The package comprises of both the assembler and a reasonable monitor. The assembler is quite complex with macros and conditional assembly supported. The editor is rather short on text/line instructions which is rather a pain in the neck.

Overall, a good quality assembler which performs well with no real problems. One of my favourites.

## Mikro Assembler

Those of you who have used the good old PET may recall this old favourite. Whilst being simple without frills, this assembler has a good pedigree and performs extremely well. One minor omission is the lack of a machine code monitor. Supersoft does offer the excellent ZOOM monitor but it's a bit of a pain to have to buy it separately.

Compared to the opposition, this product is a little pricey but it's reliable.

## Laser Genius

This product from German is one of the new breed and is the most comprehensive I've seen. It originally appeared as *Monitor/Assembler* from Osis. It has been tidied up and

assembler is a little reminiscent of that on the BBC micro. The 64's editor is used to write the source code with multiple statements on each line allowed. The assembler is told where the source code is by use of square brackets.

Both programs are unique in their use of colours to indicate the different types of instructions. In order to maximise the RAM available, the codes are tucked behind the Basic ROM.

Not a bad package and worth a look.

## Arrow 4

This and the next assembler are included simply for completeness. Both were originally marketed by the now defunct SPACE Computers.

Arrow 4 is essentially a tape turbo package. It has an assembler added as a bonus feature. The assembler is quite standard and offers no surprises. The nice addition is a disassembler which will convert object code into a fully labelled source code. This is potentially a very handy tool.

Not a bad product, and you may be able to pick it up cheap from a bankrupt stock dealer.

## Super Help

This cartridge is a combination text/monitor/assembler. The range of commands is good and the assembler quite adequate. There is a monitor but it's utterly rubbish. Again, you might be able to get it cheap.

## ZEUS 64

Bearing in mind the trouble I had trying to reach Crystal, I suspect that they may also be defunct. Having said that, I've seen this assembler in a number of shops.

The package is an assembler/disk assembler combination and is quite comprehensive albeit rather unusual in it's format. I found it a little tough to get into and the instruction booklet isn't the most lucid. Although it's disk based, it doesn't appear to support linked files.

## Finally

In summary, the 64 is quite well supported with assemblers to suit all tastes. All of the assemblers I tested did the job well enough. If, however, I was to recommend three, they would be MIKRO, Laser Genius and Assembler Monitor 64.

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supplemented by a debugging system of significant power.

The assembler uses its own operating system and it has a wide range of features. The debugger is the best I've seen and allows the creation of user-defined break definitions. At this price, this is unbeatable value.

## Machine-Code Assembler/Disassembler

This is a bit of a departure for McGraw Hill, the book publishers. The



# C16 Sound Sampler

*Now your C16 can really  
sound like a trombone with  
this excellent program.*

*By Gary Fry*

A sound sampler is a program which enables you to store any sound in memory. Once stored in memory the sound can be manipulated in various ways. Possibilities include, speed variation, reversing the sound, altering the pitch of the sound etc. You could sequence the sound like a drum machine or Paul Hardcastle's NNN Nineteen, or just use the computer keyboard as an organ, each key playing the sound at a different pitch.

This program, written for the C16 and Plus/4, allows a sample of up to two seconds to be stored in memory. This takes up a staggering 10K of the computer's memory, so you can imagine the problems getting all of the

program into the C16.

Two seconds? I hear you say.

This is actually quite a lot when you think about it. Just count it to yourself. Not many sounds take longer than this. And don't forget once you have sounds in memory you can sample them to create much longer sounds.

Sampling is quite rare to do since the Commodore Datapoint does quite a lot of the work for you - it converts the analogue voltages which make up the sound on a cassette into digital ones and zeros. These one's and zero's are then transferred to the computer's memory, just like a program when loading.

## How It Works

In order to fill the computer's memory with the necessary ones and zeros the cassette port is read (memory location 0). A process called OR-ing is then used with each byte read in to read just one bit from the number read in. By rotating the number read and repeating the process eight times, eight ones or zeros are loaded in. This gives one byte of sample. This is repeated until the 10K of memory is filled. You could look at it like a cog wheel with eight teeth 'locking' 10 holes in a long strip of paper. Each full turn of the wheel corresponding to one byte being loaded.

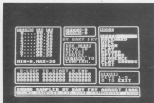
## Playing the Sample Back

This is much the same process as reading from the cassette port, but this time it is applied to the computer memory where the sample has been stored. When a one is read an and this sound is emitted from the speaker, when a one is read, an inaudible sound (too high is made). This process produces a click. Do this a thousand times in a fraction of a second, and your sound is built up.

In order to get the speed necessary for this program the screen has to be turned off during playback. This makes the computer work at almost twice normal speed.

## Playing with a Sound

The organ/piano facility is probably the best facility, this reproduces the



stated sound at differing pitches, depending on the key pressed. Only keys one to eight are used, but you can have great fun.

Sequencing plays a string of samples in an ordered sequence to produce effects such as reborn a drum machine. It is possible to have up to 63 steps which can last up to two minutes, depending on the size of each sample.

Reversal allows you to play your sample backwards.

The test option allows you to play the sound from your cassette recorder through your computer, rather like a hi-fi. This doesn't affect memory and is a useful way of getting your recording when you want it.

Don't be misled about the quality of the sound - it isn't exactly studio quality. Nevertheless, you are sure to find the quality such that you can still have a lot of fun with the program.

## Typing it in

You should have no problems typing in the three programs as they are all in Basic and have a checksum on each line.

When RUN, Program 1 will create a file on disk. This program is accessed by Program 2. Once this program is created on disk you will only need to use Program 3.

## Sample Session

In order to make the program easier to understand we have included a sample session that should make things a little easier.

## Sample Session

Insert a pre-recorded cassette into the cassette.

Move the cursor to the speed option. Press RETURN and type 4 (normal speed). Now move the cursor to the RECORD position and press RETURN. The window at the bottom should now say "PRESS PLAY" unless of course you have the PLAY down already.

The computer should now blank the screen for a couple of seconds, then beep and unblank the screen. You have now just sampled two seconds of whatever was on the tape.

## To play a sound

Move the cursor to PLAY and press RETURN. This will now blank the screen and play your sample - please note (in the more tracks on the sample the poorer the sound. If you are still not happy with the sound as it is, change the speed).

To use the sample like an organ, move the cursor down to ORGAN. Now use keys one to nine to play a tune. Key six is about the same pitch as the original sample (depending on the actual speed).

Key zero brings you back to the menu.

## Playing about with the sound

If you want to tidy up your sample, play any part of it, move the cursor to the OPTIONS function and press RETURN.

At the bottom window, it should now say SOUND. This is asking you for which sample you want to use you can reply any number from zero to seven. Press zero for sound zero. The computer should now say SB. This stands for starting block (zero to 99) but it is best to use zero to 15 because your blocks isn't a lot of sample. Then the computer will ask you the ending block (EB) this can be any number between the starting block number (the number you have just typed into number SB. Go to the ORGAN and try that! If you are still not satisfied, go to the OPTIONS function and try again!

You can also have multiple samples in memory at the same time in different blocks of memory using the OPTIONS function. Before recording a sample, go to the OPTIONS function and determine which part of memory you wish to use.

## Sequencing sounds

Whatever sounds you have in memory, you can put them into an orderly sequence and produce some interesting effects.

Say sound one was a bass drum and sound two was a hand clap, you can make these sounds play a rhythm. Try this: Go to SEQUENCE mode, and the window at the bottom will ask you if you want to play the sequence or edit it.

Type E for edit and then press RETURN.

Now type:

```
(1)1234
```

What this does is to get the numbers from left to right and to play that sound number. Sound one was a bass drum so the number one will play a bass drum, sound two was a hand clap so the number two will play a hand clap and so on.

The number nine simply ends the sequence.

The number eight (not in the sequence) jumps the sequence (jumps back to the beginning) and plays all over again. Pressing any key will exit the option.

## Producing an echo

Say you have a sample which says "hello" from blocks 00 to 15. You can produce an echo by doing this (typing in options mode each time)

```
SOUND 0 SB 00 EB 06
```

```
SOUND 1 SB 00 EB 06
```

```
SOUND 2 SB 06 EB 12
```

```
SOUND 3 SB 09 EB 15
```

Now go to sequence mode and type E for edit and press RETURN.

Type: 112345678 then N after the prompt "CONTINUE?" at the bottom window.

Voilà! You have an echo!

Please note that you cannot use the INSERT/DEL key in this mode, or any other mode. Also you have to type in seven numbers when editing the sequence simply because of memory limitations.

## Erasing Sounds

To erase a current sound from memory, go to Wipe and press return. **Warning:** You have no "ARE YOU SURE?" prompt so you only have one chance.

## Reversal

This just plays the current sound backwards. You cannot use it in SEQUENCE or ORGAN mode.

To play your sound backwards, go to BACKWARDS and press RETURN.

### Playing all sounds in memory

Doing this saves quite a lot of time. What it does is play the sounds into the audio output in order, without going to the `OPTIONS` function eight times.

100

You can use this function to get a sample ready or play the tape just to listen to it.

To get to this, go to the TEST function and press **81 FURTHER**

### Loading and saving records

Keep note of the starting blocks and the ending blocks of the sounds that you want to use.

If you have a dataset it's not really worth saving your sample (unless you think it's brilliant!) it's just like loading a commercial program!

You cannot save or load a sample in the program so you'll have to edit the `FILENAME`.

To join the TEDMON, send for the form

[illegible]

```

INFOBOL, IS: PREPARED, WILL RUN
NO
TO RUN*****
NO RUN* RUN THIS PROGRAM BEFORE
NO
TO RUN* RUN FIRST OF THE LINES
NO
NO RUN* IF YOU DO NOT THE PROGRAM
NO
NO RUN* WILL NOT WORK CORRECTLY.
NO

```

000000.00 : 000000.00 PTD

[illegible]

HOLD DOWN RUN/STOP and press RESET on the side of the computer, let go of the RESET button while still holding down RUN/STOP.

The computer will now exit to THIMON (you can let go of RUN/STOP now!)

If you want to save some money:

11/11/2011

The consumer should never see

NAME: \_\_\_\_\_

or something! Please ignore the cat there unless you're curious.

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Journal of Internal Medicine 255: 105–112

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01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 10

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There is a table for naming each sound.

[illegible]

SEQUENCE NUMBER	YOU TYPE
0	M 0060 0060
1	M 0062 0062
2	M 0064 0064
3	M 0066 0066
4	M 0068 0068
5	M 006A 006A
6	M 006C 006C
7	M 006E 006E

**L**

Load the SAMPLER. (from basic)  
Load the samples that you wish by  
typing:

```
LOAD "sample name".J (for disk)
LOAD "sample name".J (for
memory)
```

When you have loaded all the numbers from:

612

The screen will now load and off

[illegible]

[illegible]



```

1,0173 10DATA 42,43,44,45,46,47,48,49,50,51,52,53
1,0174 10DATA 54,55,56,57,58,59,60,61,62,63,64,65
1,0175 10DATA 66,67,68,69,70,71,72,73,74,75,76,77
1,0176 10DATA 78,79,80,81,82,83,84,85,86,87,88,89
1,0177 10DATA 90,91,92,93,94,95,96,97,98,99,100,101
1,0178 10DATA 102,103,104,105,106,107,108,109,110,111,112,113
1,0179 10DATA 114,115,116,117,118,119,120,121,122,123,124,125
1,0180 10DATA 126,127,128,129,130,131,132,133,134,135,136,137
1,0181 10DATA 138,139,140,141,142,143,144,145,146,147,148,149
1,0182 10DATA 150,151,152,153,154,155,156,157,158,159,160,161
1,0183 10DATA 162,163,164,165,166,167,168,169,170,171,172,173
1,0184 10DATA 174,175,176,177,178,179,180,181,182,183,184,185
1,0185 10DATA 186,187,188,189,190,191,192,193,194,195,196,197
1,0186 10DATA 198,199,200,201,202,203,204,205,206,207,208,209
1,0187 10DATA 210,211,212,213,214,215,216,217,218,219,220,221
1,0188 10DATA 222,223,224,225,226,227,228,229,230,231,232,233
1,0189 10DATA 234,235,236,237,238,239,240,241,242,243,244,245
1,0190 10DATA 246,247,248,249,250,251,252,253,254,255,256,257
1,0191 10DATA 258,259,260,261,262,263,264,265,266,267,268,269
1,0192 10DATA 270,271,272,273,274,275,276,277,278,279,280,281
1,0193 10DATA 282,283,284,285,286,287,288,289,290,291,292,293
1,0194 10DATA 294,295,296,297,298,299,300,301,302,303,304,305
1,0195 10DATA 306,307,308,309,310,311,312,313,314,315,316,317
1,0196 10DATA 318,319,320,321,322,323,324,325,326,327,328,329
1,0197 10DATA 330,331,332,333,334,335,336,337,338,339,340,341
1,0198 10DATA 342,343,344,345,346,347,348,349,350,351,352,353
1,0199 10DATA 354,355,356,357,358,359,360,361,362,363,364,365
1,0200 10DATA 366,367,368,369,370,371,372,373,374,375,376,377
1,0201 10DATA 378,379,380,381,382,383,384,385,386,387,388,389
1,0202 10DATA 390,391,392,393,394,395,396,397,398,399,400,401
1,0203 10DATA 402,403,404,405,406,407,408,409,410,411,412,413
1,0204 10DATA 414,415,416,417,418,419,420,421,422,423,424,425
1,0205 10DATA 426,427,428,429,430,431,432,433,434,435,436,437
1,0206 10DATA 438,439,440,441,442,443,444,445,446,447,448,449
1,0207 10DATA 450,451,452,453,454,455,456,457,458,459,460,461
1,0208 10DATA 462,463,464,465,466,467,468,469,470,471,472,473
1,0209 10DATA 474,475,476,477,478,479,480,481,482,483,484,485
1,0210 10DATA 486,487,488,489,490,491,492,493,494,495,496,497
1,0211 10DATA 498,499,500,501,502,503,504,505,506,507,508,509
1,0212 10DATA 510,511,512,513,514,515,516,517,518,519,520,521
1,0213 10DATA 522,523,524,525,526,527,528,529,530,531,532,533
1,0214 10DATA 534,535,536,537,538,539,540,541,542,543,544,545
1,0215 10DATA 546,547,548,549,550,551,552,553,554,555,556,557
1,0216 10DATA 558,559,560,561,562,563,564,565,566,567,568,569
1,0217 10DATA 570,571,572,573,574,575,576,577,578,579,580,581
1,0218 10DATA 582,583,584,585,586,587,588,589,590,591,592,593
1,0219 10DATA 594,595,596,597,598,599,600,601,602,603,604,605
1,0220 10DATA 606,607,608,609,610,611,612,613,614,615,616,617
1,0221 10DATA 618,619,620,621,622,623,624,625,626,627,628,629
1,0222 10DATA 630,631,632,633,634,635,636,637,638,639,640,641
1,0223 10DATA 642,643,644,645,646,647,648,649,650,651,652,653
1,0224 10DATA 654,655,656,657,658,659,660,661,662,663,664,665
1,0225 10DATA 666,667,668,669,670,671,672,673,674,675,676,677
1,0226 10DATA 678,679,680,681,682,683,684,685,686,687,688,689
1,0227 10DATA 690,691,692,693,694,695,696,697,698,699,700,701
1,0228 10DATA 702,703,704,705,706,707,708,709,710,711,712,713
1,0229 10DATA 714,715,716,717,718,719,720,721,722,723,724,725
1,0230 10DATA 726,727,728,729,730,731,732,733,734,735,736,737
1,0231 10DATA 738,739,740,741,742,743,744,745,746,747,748,749
1,0232 10DATA 750,751,752,753,754,755,756,757,758,759,760,761
1,0233 10DATA 762,763,764,765,766,767,768,769,770,771,772,773
1,0234 10DATA 774,775,776,777,778,779,780,781,782,783,784,785
1,0235 10DATA 786,787,788,789,790,791,792,793,794,795,796,797
1,0236 10DATA 798,799,800,801,802,803,804,805,806,807,808,809
1,0237 10DATA 810,811,812,813,814,815,816,817,818,819,820,821
1,0238 10DATA 822,823,824,825,826,827,828,829,830,831,832,833
1,0239 10DATA 834,835,836,837,838,839,840,841,842,843,844,845
1,0240 10DATA 846,847,848,849,850,851,852,853,854,855,856,857
1,0241 10DATA 858,859,860,861,862,863,864,865,866,867,868,869
1,0242 10DATA 870,871,872,873,874,875,876,877,878,879,880,881
1,0243 10DATA 882,883,884,885,886,887,888,889,890,891,892,893
1,0244 10DATA 894,895,896,897,898,899,900,901,902,903,904,905
1,0245 10DATA 906,907,908,909,910,911,912,913,914,915,916,917
1,0246 10DATA 918,919,920,921,922,923,924,925,926,927,928,929
1,0247 10DATA 930,931,932,933,934,935,936,937,938,939,940,941
1,0248 10DATA 942,943,944,945,946,947,948,949,950,951,952,953
1,0249 10DATA 954,955,956,957,958,959,960,961,962,963,964,965
1,0250 10DATA 966,967,968,969,970,971,972,973,974,975,976,977
1,0251 10DATA 978,979,980,981,982,983,984,985,986,987,988,989
1,0252 10DATA 990,991,992,993,994,995,996,997,998,999,1000,1001
1,0253 10DATA 1002,1003,1004,1005,1006,1007,1008,1009,1010,1011,1012,1013
1,0254 10DATA 1014,1015,1016,1017,1018,1019,1020,1021,1022,1023,1024,1025
1,0255 10DATA 1026,1027,1028,1029,1030,1031,1032,1033,1034,1035,1036,1037
1,0256 10DATA 1038,1039,1040,1041,1042,1043,1044,1045,1046,1047,1048,1049
1,0257 10DATA 1050,1051,1052,1053,1054,1055,1056,1057,1058,1059,1060,1061
1,0258 10DATA 1062,1063,1064,1065,1066,1067,1068,1069,1070,1071,1072,1073
1,0259 10DATA 1074,1075,1076,1077,1078,1079,1080,1081,1082,1083,1084,1085
1,0260 10DATA 1086,1087,1088,1089,1090,1091,1092,1093,1094,1095,1096,1097
1,0261 10DATA 1098,1099,1100,1101,1102,1103,1104,1105,1106,1107,1108,1109
1,0262 10DATA 1110,1111,1112,1113,1114,1115,1116,1117,1118,1119,1120,1121
1,0263 10DATA 1122,1123,1124,1125,1126,1127,1128,1129,1130,1131,1132,1133
1,0264 10DATA 1134,1135,1136,1137,1138,1139,1140,1141,1142,1143,1144,1145
1,0265 10DATA 1146,1147,1148,1149,1150,1151,1152,1153,1154,1155,1156,1157
1,0266 10DATA 1158,1159,1160,1161,1162,1163,1164,1165,1166,1167,1168,1169
1,0267 10DATA 1170,1171,1172,1173,1174,1175,1176,1177,1178,1179,1180,1181
1,0268 10DATA 1182,1183,1184,1185,1186,1187,1188,1189,1190,1191,1192,1193
1,0269 10DATA 1194,1195,1196,1197,1198,1199,1200,1201,1202,1203,1204,1205
1,0270 10DATA 1206,1207,1208,1209,1210,1211,1212,1213,1214,1215,1216,1217
1,0271 10DATA 1218,1219,1220,1221,1222,1223,1224,1225,1226,1227,1228,1229
1,0272 10DATA 1230,1231,1232,1233,1234,1235,1236,1237,1238,1239,1240,1241
1,0273 10DATA 1242,1243,1244,1245,1246,1247,1248,1249,1250,1251,1252,1253
1,0274 10DATA 1254,1255,1256,1257,1258,1259,1260,1261,1262,1263,1264,1265
1,0275 10DATA 1266,1267,1268,1269,1270,1271,1272,1273,1274,1275,1276,1277
1,0276 10DATA 1278,1279,1280,1281,1282,1283,1284,1285,1286,1287,1288,1289
1,0277 10DATA 1290,1291,1292,1293,1294,1295,1296,1297,1298,1299,1300,1301
1,0278 10DATA 1302,1303,1304,1305,1306,1307,1308,1309,1310,1311,1312,1313
1,0279 10DATA 1314,1315,1316,1317,1318,1319,1320,1321,1322,1323,1324,1325
1,0280 10DATA 1326,1327,1328,1329,1330,1331,1332,1333,1334,1335,1336,1337
1,0281 10DATA 1338,1339,1340,1341,1342,1343,1344,1345,1346,1347,1348,1349
1,0282 10DATA 1350,1351,1352,1353,1354,1355,1356,1357,1358,1359,1360,1361
1,0283 10DATA 1362,1363,1364,1365,1366,1367,1368,1369,1370,1371,1372,1373
1,0284 10DATA 1374,1375,1376,1377,1378,1379,1380,1381,1382,1383,1384,1385
1,0285 10DATA 1386,1387,1388,1389,1390,1391,1392,1393,1394,1395,1396,1397
1,0286 10DATA 1398,1399,1400,1401,1402,1403,1404,1405,1406,1407,1408,1409
1,0287 10DATA 1410,1411,1412,1413,1414,1415,1416,1417,1418,1419,1420,1421
1,0288 10DATA 1422,1423,1424,1425,1426,1427,1428,1429,1430,1431,1432,1433
1,0289 10DATA 1434,1435,1436,1437,1438,1439,1440,1441,1442,1443,1444,1445
1,0290 10DATA 1446,1447,1448,1449,1450,1451,1452,1453,1454,1455,1456,1457
1,0291 10DATA 1458,1459,1460,1461,1462,1463,1464,1465,1466,1467,1468,1469
1,0292 10DATA 1470,1471,1472,1473,1474,1475,1476,1477,1478,1479,1480,1481
1,0293 10DATA 1482,1483,1484,1485,1486,1487,1488,1489,1490,1491,1492,1493
1,0294 10DATA 1494,1495,1496,1497,1498,1499,1500,1501,1502,1503,1504,1505
1,0295 10DATA 1506,1507,1508,1509,1510,1511,1512,1513,1514,1515,1516,1517
1,0296 10DATA 1518,1519,1520,1521,1522,1523,1524,1525,1526,1527,1528,1529
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1,0300 10DATA 1566,1567,1568,1569,1570,1571,1572,1573,1574,1575,1576,1577
1,0301 10DATA 1578,1579,1580,1581,1582,1583,1584,1585,1586,1587,1588,1589
1,0302 10DATA 1590,1591,1592,1593,1594,1595,1596,1597,1598,1599,1600,1601
1,0303 10DATA 1602,1603,1604,1605,1606,1607,1608,1609,1610,1611,1612,1613
1,0304 10DATA 1614,1615,1616,1617,1618,1619,1620,1621,1622,1623,1624,1625
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1,0310 10DATA 1686,1687,1688,1689,1690,1691,1692,1693,1694,1695,1696,1697
1,0311 10DATA 1698,1699,1700,1701,1702,1703,1704,1705,1706,1707,1708,1709
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1,0313 10DATA 1722,1723,1724,1725,1726,1727,1728,1729,1730,1731,1732,1733
1,0314 10DATA 1734,1735,1736,1737,1738,1739,1740,1741,1742,1743,1744,1745
1,0315 10DATA 1746,1747,1748,1749,1750,1751,1752,1753,1754,1755,1756,1757
1,0316 10DATA 1758,1759,1760,1761,1762,1763,1764,1765,1766,1767,1768,1769
1,0317 10DATA 1770,1771,1772,1773,1774,1775,1776,1777,1778,1779,1780,1781
1,0318 10DATA 1782,1783,1784,1785,1786,1787,1788,1789,1790,1791,1792,1793
1,0319 10DATA 1794,1795,1796,1797,1798,1799,1800,1801,1802,1803,1804,1805
1,0320 10DATA 1806,1807,1808,1809,1810,1811,1812,1813,1814,1815,1816,1817
1,0321 10DATA 1818,1819,1820,1821,1822,1823,1824,1825,1826,1827,1828,1829
1,0322 10DATA 1830,1831,1832,1833,1834,1835,1836,1837,1838,1839,1840,1841
1,0323 10DATA 1842,1843,1844,1845,1846,1847,1848,1849,1850,1851,1852,1853
1,0324 10DATA 1854,1855,1856,1857,1858,1859,1860,1861,1862,1863,1864,1865
1,0325 10DATA 1866,1867,1868,1869,1870,1871,1872,1873,1874,1875,1876,1877
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1,0327 10DATA 1890,1891,1892,1893,1894,1895,1896,1897,1898,1899,1900,1901
1,0328 10DATA 1902,1903,1904,1905,1906,1907,1908,1909,1910,1911,1912,1913
1,0329 10DATA 1914,1915,1916,1917,1918,1919,1920,1921,1922,1923,1924,1925
1,0330 10DATA 1926,1927,1928,1929,1930,1931,1932,1933,1934,1935,1936,1937
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1,0332 10DATA 1950,1951,1952,1953,1954,1955,1956,1957,1958,1959,1960,1961
1,0333 10DATA 1962,1963,1964,1965,1966,1967,1968,1969,1970,1971,1972,1973
1,0334 10DATA 1974,1975,1976,1977,1978,1979,1980,1981,1982,1983,1984,1985
1,0335 10DATA 1986,1987,1988,1989,1990,1991,1992,1993,1994,1995,1996,1997
1,0336 10DATA 1998,1999,2000,2001,2002,2003,2004,2005,2006,2007,2008,2009
1,0337 10DATA 2010,2011,2012,2013,2014,2015,2016,2017,2018,2019,2020,2021
1,0338 10DATA 2022,2023,2024,2025,2026,2027,2028,2029,2030,2031,2032,2033
1,0339 10DATA 2034,2035,2036,2037,2038,2039,2040,2041,2042,2043,2044,2045
1,0340 10DATA 2046,2047,2048,2049,2050,2051,2052,2053,2054,2055,2056,2057
1,0341 10DATA 2058,2059,2060,2061,2062,2063,2064,2065,2066,2067,2068,2069
1,0342 10DATA 2070,2071,2072,2073,2074,2075,2076,2077,2078,2079,2080,2081
1,0343 10DATA 2082,2083,2084,2085,2086,2087,2088,2089,2090,2091,2092,2093
1,0344 10DATA 2094,2095,2096,2097,2098,2099,2100,2101,2102,2103,2104,2105
1,0345 10DATA 2106,2107,2108,2109,2110,2111,2112,2113,2114,2115,2116,2117
1,0346 10DATA 2118,2119,2120,2121,2122,2123,2124,2125,2126,2127,2128,2129
1,0347 10DATA 2130,2131,2132,2133,2134,2135,2136,2137,2138,2139,2140,2141
1,0348 10DATA 2142,2143,2144,2145,2146,2147,2148,2149,2150,2151,2152,2153
1,0349 10DATA 2154,2155,2156,2157,2158,2159,2160,2161,2162,2163,2164,2165
1,0350 10DATA 2166,2167,2168,2169,2170,2171,2172,2173,2174,2175,2176,2177
1,0351 10DATA 2178,2179,2180,2181,2182,2183,2184,2185,2186,2187,2188,2189
1,0352 10DATA 2190,2191,2192,2193,2194,2195,2196,2197,2198,2199,2200,2201
1,0353 10DATA 2202,2203,2204,2205,2206,2207,2208,2209,2210,2211,2212,2213
1,0354 10DATA 2214,2215,2216,2217,2218,2219,2220,2221,2222,2223,2224,2225
1,0355 10DATA 2226,2227,2228,2229,2230,2231,2232,2233,2234,2235,2236,2237
1,0356 10DATA 2238,2239,2240,2241,2242,2243,2244,2245,2246,2247,2248,2249
1,0357 10DATA 2250,2251,2252,2253,2254,2255,2256,2257,2258,2259,2260,2261
1,0358 10DATA 2262,2263,2264,2265,2266,2267,2268,2269,2270,2271,2272,2273
1,0359 10DATA 2274,2275,2276,2277,2278,2279,2280,2281,2282,2283,2284,2285
1,0360 10DATA 2286,2287,2288,2289,2290,2291,2292,2293,2
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# Extended Basic

*Paul Eves presents a Basic extension that adds 27 useful commands to the C64's extremely limited Basic.*

**B**asic Version 2.0 as supplied on the C64 is very limiting. No instructions are provided to help you with such things as getting a directory from your disk drive, merging two programs together or even remembering your program.

The extended Basic given away free with this month's issue of *Your Commodore* changes all that. A total of 27 new commands have been added that you will no doubt find invaluable in your day to day programming.

To use the program simply position the cassette in your cassette recorder and type `LOAD "EXBAS"` and press RETURN. Once the program has finished loading it will announce itself and it will be ready for use.

## General Toolkit Commands

Toolkit or program development commands are probably the greatest missed form of instruction on the C64. How many times have you written a Basic program that the line numbers went in the order 10,12,13,17,20, etc. Wouldn't a `RENUMBER` command make life a lot easier, will now you've got one as well as many more of this type of command.

Should you want to remember your programs then you can now use the `RENUM` command this has the following format:

`RENUMx,y,z`

Where x is the line number where the renamer should start. If x is 0 then the whole program is renumbered, y is the new increment for the lines. If y was 10 then the lines would step up in tens, if it was 15 then the line numbers would be 15 apart.

z is the new start line. This is the

line number that the first line to be renumbered should be replaced with.

For example: `RENUM0,1,5` will renumber the whole of the program with an increment of 5 and a start line number of 5.

The `AUTO` command will automatically generate line numbers for you. Enter the command `AUTO 10,30` and you will be prompted with the line number 10. Finish typing in that line press RETURN and line 20 pops upon it by magic. If you would rather have your program starting at line 100 and going up in steps of 30 then you would simply enter the command `AUTO 100,30`. When you want to quit this command simply press RETURN on a line with just the number and no text on it.

Once you have finished writing your latest Basic masterpiece there are bound to be program lines that are no longer needed. That's an easy one you say, simply type the number of the line that you want to delete and it will be erased. That's OK, but what if you wanted to delete 20, 30 or even 100 lines! This would obviously take quite a while if you were to enter each of the numbers individually. Well the `DEL` command comes to your rescue. This command allows a block of program to be deleted. The command `DEL number`, would delete all lines from "number" onwards. For example, `DEL 100`, would delete all lines from 100 onwards. If you wanted to erase a block of code in the middle of the program you would use the command in the form `DEL number 1 number 2`. This will delete all lines from line number "number 1" to line number "number 2".

When you come to testing a program it is often useful to see exactly what variables have been set up and what their values are. This is extremely

useful if your program has crashed with an error and you are trying to find out why. The command `DUMP` will print out the name and value of all variables that have been set up by the program. (NOTE: the program must have been RUN first or the variables will not have been set up).

The function keys on the C64 have always been a little bit of a mysterious beast. Unlike those on the BBC and other computers you can't actually program them. Well now you can with the `KEY` command. This command is extremely powerful as it allows you to store, in each of the function keys, a text string. For example you may want the key F1 to cause your program to be renumbered. Well you can now store the Extended Basic word `RENUM` in this key. The command can take two forms:

`KEY` by itself will print out a list of all of the function keys and the text that is stored with them.

`KEY number, "text"` will assign a given string to the numbered key.

If you wish to use a space in your text you must enter it as a shifted space, i.e. press shift and the spacebar. RETURNS can be entered by placing the back arrow at the end of your text.

For example let's assume that you wanted to put the keyword `list` on key 4 and you wanted a RETURN at the end so that the command was executed, you would use the following command:

`KEY4, "LIST<CR"`

(NOTE: any of the above commands will enable the function keys if you have turned them off).

Should you wish to turn off the function keys then you should simply enter the command `OFF`.

When typing in your program it is always useful to know how much

memory you have left. MEM will display the amount of Basic memory available at any time.

After spending much time at the keyboard there is nothing more frustrating to find that you typed the NEW command and wiped out your program without SAVING it first. Don't worry the program is still in memory and the OLD command will bring it back for you.

When you come to checking your programs there are two commands that are invaluable. The first of these is the LIST command. Yes there is one on the C64, but have you tried to read a listing as it slips off the top of the screen? Will LIST can be modified so that pressing the SHIFT key will pause the list. NOTE: pressing down SHIFT LOCK will pause the listing until it is released. To initiate this modification you simply enter the PAUSE command.

The second useful command is the TRACE function. This command allows you to slowly step through a program one line at a time, the line number being operated on being displayed on the screen. The TRACE command takes the following format:

TRACE

You must press the space bar to initiate the next line, while in trace mode. Hitting a numeric key will alter the speed of the trace.

When you have finished with your trace you must turn it off with the TROFF command.

### Using a Drive

If you own a Commodore disk drive you will no doubt find it extremely annoying that you can't look at a directory of a disk without LOADING it into memory and overwriting the program that is there. Well now you can use the DIR command which will display the directory of the disk on the screen without destroying the program. The syntax for this command is:

DIRs

where s is either 0 or 1. The 0 and 1 represent the drive numbers. A number must always be present. If you have a single drive then you must use DIR0.

If you should ever have a disk drive error you can read the error channel

with the DERR command. This will display on screen the current disk drive status.

Sending commands to the disk drive has also been made a lot easier with the DISK command. This command takes the form:

DISK "command:string, string, etc"

where command is one of the disk commands and the strings are as associated with the command. For example: DISK "S:PROG1,PROG2" will delete the two programs from the disk.

DISK "V" will perform a validate command.

### Playing With Numbers

When developing a program it is quite useful to be able to transfer numbers from one base to another. This Basic provides commands for Binary and Hexadecimal conversion.

#### B-D number

This command converts an eight bit binary number into two decimal numbers, shown as low byte/high byte. Any number of conversions can be entered in, providing that each set of digits are separated by a comma. For example the command:

B-D 1001100,0001010

would give the following result:

204/51214, 136/51520

NOTE: the syntax is the same for all conversions.

#### D-B number

Conversion between decimal and binary is possible with this command. The decimal number must be in the range 0 to 65535. The binary equivalent is printed as a 16 bit binary number. For example:

D-B 32768

prints the result:

10000000 00000000

#### D-H Number

Conversion from decimal to hex is possible with this command. The decimal number must be in the same range as the above command.

The H-D command has the opposite effect to the above command and will change a hexadecimal number to decimal. NOTE: do not use a B before the hexadecimal number.

### Program Manipulation

If you do a lot of programming it is very handy to have a large number of commonly used subroutines stored on disk or cassette. For example you may have a collection of special input routines, routines to read the joystick port, etc. On a standard C64 the only way to get these programs on to the end of a program was to type them in again. Two new commands will save you from this trouble, these are APP and MERGE.

Let's say that you have a program on disk that has the form:

```
15 PRINT "THERE"
20 PRINT "THERE"
```

and you had a program in memory that looked like this:

```
10 PRINT "HELLO"
20 PRINT "HELLO"
```

You can stick the program that is on disk on to the end of the one in memory with the APP (append) command. The format for this command is quite simple:

APP "program", device.

If your program on disk was called "test" then you would enter the command:

APP "test",2

this would leave the program in memory looking like this:

```
10 PRINT "HELLO"
20 PRINT "HELLO"
15 PRINT "THERE"
25 PRINT "THERE"
```

As you can see it will be necessary to use the rnumber command to get the program lines in the correct numerical order.

The APP command simply adds one program on to the end of the other. The MERGE command is a little more powerful as it will stick together the two programs in such a way as the new program lines are added to the old program in their correct position. NOTE: if the two programs have the

same line numbers then the new program lines will overwrite the old.

If we look at our previous example and give the command:

```
MERGE "test".A
```

then you will get the following result:

```
10 PRINT "HELLO"
15 PRINT "THERE"
20 PRINT "HELLO"
25 PRINT "THERE"
```

no doubt you can see the difference.

### Playing With Memory

Quite often when writing programs it is necessary to save a block of memory to tape or disk. The C64 has no commands available to do this so you must resort to POKEing memory. This gets a little messy and confusing. The MLOAD,MSAVE and MYVERIFY commands will rectify this.

MLOAD takes the following format:

```
MLOAD "program".dev,1,a
```

and allows you to LOAD a program into any area of memory. 'dev' is the number of the device that you want to

LOAD from and 'a' is the address where you want the LOAD to start from.

MSAVE allows you to SAVE a section of memory to the specified device it has the form:

```
MSAVE "name".dev,1,a,b+1
```

where 'a' is the start address for the SAVE and 'b' is the end address. DON'T forget to add one on to this.

If you should ever use machine code then it is quite useful to be able to set where in memory you want your Basic program to start. It is also useful to be able to set the top limit for your program as well. These functions can both be performed by POKEs, however the HI and LO commands make this much easier.

HI address

will set the Top of memory to 'address' and

LO address

will set the bottom of memory to 'address'.

### Program Readability

Commodore programs are not exactly well known for their legibility, as you are no doubt aware they have lots of graphics symbols in them for things like clearing the screen etc. The CODE command will turn any graphics symbols into mnemonics that represent the code that is being used. For example a graphic hart which is found by pressing shift 5 would be represented by (X) > 5) which means graphic (G) shift (>) and 5.

To use the command you must have the program to be changed in memory and then enter the command CODE.

NOTE: once this command has been issued you will not be able to use the program again, except for listings, etc, so make sure that you have saved a copy of the program onto disk or cassette.

### Leaving Extended Basic

Provision has been made in case you should ever want to quit from the Basic and return to standard C64 Basic. Simply type the word QUIT and everything will be back to normal.

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YOUR COMMODORE november 1986 33

# The Newsroom

Design your own newspapers with this package from Ariolasoft.

By Stuart Cooke.



Writing and publishing your own newspaper is something that may or may not have tried your first entry into the world of journalism may have been a school newspaper, a paper for their own or even the local church magazine. There are no doubts it there's a little bit of the Rupert Murdoch in all of us.

The newsroom one of the latest releases from Ariolasoft, brings the world of electronic publishing to your own computer.

Basically the program turns your computer into a complete printing machine. As your disposal you have the ability to place words, pictures and other photographs that are required to accompany your text. The program also allows you to design the headlines for your pages. At the very least you can write your stories, the layout area allows you to design your paper and at last you can print it with the printer.

One further and extremely interesting feature is the Wire Service. This allows you to use your computer together with a modem to send stories with other people, down the phone line. Unfortunately this when used the computer will in some instances be unusable for use with the Commodore modem you own here for use with Commodore modems. If you do have access to an RS232C modem you could save some head pain by swapping stories with friends. Unfortunately due to the fact that I don't have a modem available this couldn't be tested.

**Using the program**  
Newsroom is extremely easy to use as it is again menu driven. You can use speech, a keypad or the keyboard to access information. The only annoying the keyboard must be used for entering text.

The first menu upon loading is a shot of the White Walkers. Selecting the option that you require is simply a matter of high-lighting the correct

perform all the formatting of the text. This means that you don't have to worry about where your text starts at the end of lines, or layout around pictures. However, as the text around the previous picture shows the breaks may not be exactly where you want them.

As previously stated all operations within the program are selected from menus. These take the form of a number of words or pictures down the side of your square work area. The menu for example will bring up the printing functions, the others takes a photograph etc. In fact the program is really easy to use. The only really annoying thing about the program is the number of times that it is necessary to stop before, just about every operation within the program requires a stop at the menu. It would have been nice to see a dual drive option for those people who have two drives, this would certainly have reduced the amount of stopping required.

I have already stated that your work area is a square upon the screen. This may seem a little strange when you think of how a paper looks but it does make sense once you understand how you lay the paper out. The newspaper is made up of a number of pages, the squares, all which together, then page is actually made up of the columns of these pages plus a header above the top. As I said once you understand how the structure of the paper works it is extremely easy to follow. You don't have to make your stories etc. Or over occupy one panel. In fact this line is the start of a new panel.

## Taking a Photo

Perhaps where the pictures that are attached with your text photographs, is a little bit of a cheat, since they are actually drawn on the computer screen and not loaded into the program on a double sided disc.

Thankfully the back of the manual shows you every place where a picture is available. As can be seen from the pictures



area and commands the user to use the keyboard to enter text.



included with this article there are quite a variety available. You are not stuck with using just the pictures supplied with the program. The graphics option allows a large range of graphics commands including various fills, boxes etc. With this you can design your own pictures or simply place the existing ones. The picture above is actually made from a picture of a mouse hole and a picture of a cat. Both placed on one, the walls were then added using the graphics option. Obviously within this system the pictures are only there to illustrate what the program can do. When writing your own newspaper the pictures should of course complement the story that you are writing. For example the following picture could be used to illustrate a story about a road accident.



In fact the pictures, or photos, are only limited by your imagination and artistic ability. It uses the same technique as the program, but is extremely easily drawn, with the same thin lines that make the other pictures look like a child's drawing. The background will come in very handy.

## The Copy Desk

This is where you actually sit down and write your text. Within each of the panels you can use two type faces, available for use are small and large serif, plain and sans serif, and a large variety, so far as all text styles that could be used, produced with the same font. The heading and text of the panel is in the same serif font. The difference between the text is fairly obvious. If you are interested the newspaper is printed in a serif font. The text faces chosen, in order, are serif, sans serif, and plain. It is quite useful, for headlines, the next step was using the type so that you can see what it looks like.

As I have said the program handles all of the formatting of the text, such as bold, italics, you do want to include a picture in a panel is a good idea to load it in before you start writing so that you can position it where you require it. This means that you can see exactly how much room is left for text. As the picture demonstrates the program actually acts as though there is a picture across the entire row actually, once the picture is loaded, the program will tell you that when you start writing there may be text, or white space, appearing on the line. It will not let you use it. This doesn't matter too much if you are careful about where things are placed. However, you can crop a picture down to suit the space.

## Designing a head

The header option allows you to design the masthead, or title that is to go at the top of your paper. As with the copy option pictures can be included here as well as text. The main difference between this and the copy option is that the masthead is obviously a lot wider and you don't have to take a photo of anything. When used the header can be either designed yourself with a graphics option, the page as with photos, and pictures can be chosen from the range available on the floppy disk. The design of your masthead is therefore totally at your control. For the head of this piece I simply chose a piece that suits most people's ideas of a journalist.

## Laying it all out

Design of your newspaper is obviously extremely important. After all it is people who will read it. With this in mind, the program with LAYOUT aids in the layout option is where you actually place all the panels that you have designed in some sort of order. The structure of your actual paper can take one of four formats:

- 1. 11 inches with banner.
- 2. 11 inches without banner.
- 3. 14 inches with banner.
- 4. 14 inches without banner.

In previous versions I have used each of the first two options. The first page was made up of a banner plus three panels. The second is made up of four panels per column. The actual positioning of your stories is important since you need to give the reader the best possible effect.

## Printing Press

Printing your paper should pose no problem. Most home printers and interfaces are catered for including the Apple II and Laser. This is probably the best package that I have used that has an option for a printer interface. Usually I have used a printer interface, usually I have used a printer interface. It is worth pointing out that the interfaces catered for are American, so that may cause a few problems. It is worth noting that the interfaces are available from Ardiansoft. Within the printing press you have the facility to print out pictures, panels, banners and complete pages. This version does completely with newspaper, giving some idea of what the paper looks like.

## Final thoughts



I don't think ever had so much fun writing a review as I did with this one. If you can't have access to a printer then the program is a must.

## Touchline

Program: The Newspaper, Ardiansoft Ltd.  
Price: £69.95. Supplier: Ardiansoft



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## Checksum Program

The hexadecimal numbers appearing in a column to the left of the listing should not be typed in with the program. These are merely checksum values and are there to help you get each line right. Don't worry if you don't understand the hexadecimal system, as long as you can compare two characters on the screen with the corresponding two characters in the magazine you can use our line checking program.

Type in the Checksum Program, make sure that you've not made any mistakes and save it to tape or disk

immediately because it will be used with most of the present and future listings appearing in Your Commodore.

At the start of each programming session, load Checksum and run it. The screen will turn brown with yellow characters and each time you type in a line and press the RETURN key a number will appear on the screen in white. This should be the same as the corresponding value in the magazine.

If the two values don't relate to one another, you have not copied the line exactly as printed so go back and check each character carefully. When you find the error simply correct it and

















press RETURN again.

If you want to turn off the checker simply type SY\$09132 and the screen will return to the familiar blue colour. You can then do whatever it was you wanted to do and if this doesn't use the area where Checksum lies you can go back to it with the same SY\$ command.















No system is foolproof but the chances of two errors cancelling one another out are so remote that we believe our listings are more reliable than any other magazine in the world. So get typing!

TE

### Mnemonic Symbol Keypress

[RIGHT]		CBSK left/right
[LEFT]		SHIFT & CBSK left/right
[DOWN]		CBSK up/down
[UP]		SHIFT & CBSK up/down
[F1]		F1 key
[F2]		SHIFT & F1 key
[F3]		F3 key
[F4]		SHIFT & F3 key
[F5]		F5 key
[F6]		SHIFT & F5 key
[F7]		F7 key
[F8]		SHIFT & F7 key
[HOME]		CLR/HOME
[CLR]		SHIFT & CLR/HOME
[RVSON]		CTRL & 9
[RVSOFT]		CTRL & 0

### Mnemonic Symbol Keypress

[BLACK]		CTRL & 1
[WHITE]		CTRL & 2
[RED]		CTRL & 3
[CYAN]		CTRL & 4
[PURPLE]		CTRL & 5
[GREEN]		CTRL & 6
[BLUE]		CTRL & 7
[YELLOW]		CTRL & 8
[FOUND]		F
[LARROW]		←
[UPARROW]		↑
[F1]		SHIFT & ↑
[INST]		SHIFT & INST/DEL
[REV T]		see text
[Clear]		CRN + letter
[Store]		SHIFT + letter

# Software for sale

If you think that one of our programs looks very interesting, but you can't afford the time to type it in then our software service will help you out.

**I**n three o'clock in the morning. You sit at the computer keyboard just finished a marathon typing session entering one of the superb programs from *Four Commodore*. Your fingers reach for the keyboard and press the letters R, U and N. You press RETURN, sit back and nothing happens.

Everyone has probably faced this problem. When it does happen it's a matter of spending hours searching through the program for any typing mistakes. No matter how long you look or how many people help you, you can usually guarantee that at least one little bug slips through unnoticed.

The *Four Commodore Software Service* makes available all of the programs from each issue on both cassette and disk at a price of £6.00 for disk and £4.00 for cassette. Most of the documentation for the programs is supplied with the software since it is all available in the relevant magazine. Should you not have the magazine then back issues are available from the following address:

INFONET LTD, Times House, 179 The Marlowes, Hemel Hempstead, Herts. HP1 1BB.  
TEL: (0442) 48435

please contact this address for prices and availability.

## The Cassette

All programs on the cassette are saved using a turbo program. If you have ever purchased software from us on cassette before it is worth pointing out that as of this issue cassette the turbo used has been altered. On all cassettes for previous issues the programs are unprotected and appear in the same format as they do in the magazine i.e. in the form of Basic loaders. The new turbo being used from this issue onwards allows us to produce fully working versions of the program on cassette. This means that you will simply have to LOAD the program in and they will automatically start. Should we put any programs for the C128 on the cassette they will be stored as C64 programs. LOAD these programs into the computer in C64 format and save them to cassette or disk. To use the program turn your computer into C128 mode and LOAD and RUN as normal.

## The Disk

Programs on the disk will also be supplied as totally working versions, i.e. where possible we will not use Basic Loaders thus making use of the programs much easier. Unfortunately at the moment we cannot duplicate C64 and Plus/4 cassettes. However programs for these machines will be available on the disk.

What programs are available?

At the top of each article you will find a strap containing the article type, C64 Program etc. So that you can see which programs are available on which format you will also find a couple of symbols after this strap. The symbols have the following meaning:



This symbol means that the program is available on cassette.



These programs are available on disk.

## Please Note

Since the programs supplied on cassette are total working versions of the program, we do not put disk only programs on tape. There is no sense in placing a program that expects to be loading from disk on to tape.

## UTILITY SPECIAL

This contains a few of our most popular utilities from earlier issues of the magazine. The programs are:

**MACH2** our disk based assembler from Nov '85 to Feb '86.  
**STOP THEIF** — add protection to your programs with this utility from our Feb '86 issue.

**IN CHARACTER** — an excellent character editor from November 1985.

**MOB MAKER** — to complement the character editor, a sprite editor from the March 1985 issue.

**DISK EDITOR** — an extremely powerful utility for disk drive owners allowing you to directly access and alter every segment of your disk.

Should you not have any of the above issues and would like instructions then a full set of photocopies is available for £1.50. Please order this separately from: Four Commodore, Utility Special Photocopies, No 1 Golden Square, London W1R 3AB. Cheques or Postal orders to be made payable to A.S.F. Ltd.

**ORDER CODE**  
**DISK — YDM1A862 £6.00**  
**TAPE — YCM1A862 £4.00**

### MARCH 1986

**KUNG FU** — All the fun of the orient with this entry to our programme of the year competition.  
**DATA MAKER** — Machine code to Basic made easy with this utility — **DISK ONLY (C64)**.  
**HYPER BASIC** — An extended Basic with a powerful built-in machine code assembler (C64).  
**SCROLLING** — A superb routine to scroll your screen with ease in a horizontal direction. A must for games programmers (C64).  
**RAINBOW DISK** — Add some colour to your disk directory listings with this interesting utility (C64).  
**GRID SEARCH** — Can you find the hidden mines in this excellent game (C64)?

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### APRIL 1986

**TELEPHONE EXCHANGE** — Our excellent teletype communications program for use with a C64 and RS232 modem.  
**SPRITES** — Ease your manipulation of sprites with this utility. Includes sprite animation, collision detection, sprite design etc (C64).  
**DATA BOOK** — Keep track of your information with this database program for the C128.  
**BASIC TEST SYSTEM** — A useful utility for debugging programs. Commands include TRACE, SINGLE STEP and the ability to set break points (C64).  
**TOPMON** — A superb machine code monitor with 19 commands including Decimal to Hex conversion, disk access, memory disassembly etc. (C64).  
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### MAY 1986

**ADVENTURE AID** — A set of routines to help you write your adventures. Includes facilities for setting up location

descriptions, vocabulary etc. (C64).  
**TELEPHONE EXCHANGE** — (See April 1986).  
**3D ROUTINES** — Routines to allow you to produce effects similar to those found in the famous 3D maze type game (C64).  
**WORDPROB** — A powerful disk based wordprocessor for use with the C64. Includes commands for line spacing, setting margins, performing word counts etc.  
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### JUNE 1986

**DATABASE 64** — A superb database program for 64 owners, for use with tape or disk.  
**TAPE INLAY** — Produce tape inlay cards with your C64 and your 1520 printer/plotter.  
**LOW RES UTILITY** — Plotting routines for use with your C64 and its low-res graphics. Includes dots, lines etc.  
**BETTER MATRIX** — Producer descenders on your MPS-800 printer (C64).  
**BUDGET 64** — Keep track of your finances with this C64 program. Up to 30 different budgets can be set up within each bank account.

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### JULY 1986

**DATABASE 128** — Keep track of your disks with this utility for the C128.  
**DETAILED DISK** — Gives useful information about your disks including track and sector at which programs are stored, start address of program and address etc. (C64).  
**IDEAL A FILE** — Files downloaded with our TELEPHONE EXCHANGE program can now be edited with this extension for the C64.  
**ASSEMBLER 128** — A full blown assembler for use with your C128 and tape or disk.  
**LUNAR ORDEAL** — Rescue the stranded men in this game for the C64.

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### AUGUST 1986

**FAST FORMATTER** — Speed up the formatting speed of your 1541 disk drive with this handy program (C64).  
**NTON EDITOR** — Our much acclaimed graphics editor for the C64 now used by many professional programmers.

Includes: Character Editor; Sprite Editor; Sprite animator; Scrolling backdrop editor.

**DIMON 128** — Disk utility program for the C128. Includes commands for editing tracks and sectors of the disk, protecting programs, write protect disk etc.

**ORDER CODE**  
**DISK YDAUG86** £6.00  
**TAPE YCAUG86** £4.00

## SEPTEMBER 1986

**BACKDROPS** — Sample backgrounds and sprites for use with the RSN1 EDITOR published in August 1986.

**ASSEMBLER 128** — Full C128 assembler. Same as JULY86 issue.

**ICON DRIVER** — A small routine that allows you to move a sprite around the screen with a joystick. Useful if you want to develop an icon program (C64).

**RECONFIGURE** — Develop routines to alter the memory configuration of your C64 with ease.

**CROSSWORD** — Put your brain to work with this expert

crossword program. Includes four crosswords for you to try (C64).

**ALL CLEAR** — Some interesting ways to clear the screen with this collection of routines (C64).

**ADVENTURE GRAPHICS** — Add graphics capability to our ADVENTURE AID program published in the May 1986 edition of Your Commodore (C64).

**ORDER CODE**  
**DISK YSESEP86** £6.00  
**TAPE YCSEP86** £4.00

## OCTOBER 1986

**CROSSWORD** — See September issue.

**POP UP MENUS** — A superb routine that allows you to add pop-up menus to your C64.

**PILOT** — A full implementation of this extremely popular educational language for your C64.

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# Videobasic 64

*Evelyn Mills has been testing out a new product from Adamsoft.*

**F**irst, a word about Videobasic, the forerunner of the current release Videobasic 64. The former has been around for quite some time - three years in fact - and, to quote Keith Bowden in *The Companion to the Commodore 64*, "it is the best software library available for the Commodore 64".

As a consistent user of Videobasic, I heartily endorse his comments. His-on graphics, circling, blocking, filling etc. are well covered in this software, plus nearly hundred sprites, sound and, most important of all, the very versatile Turtle Graphics which work via direct command at an exceedingly fast rate. All this is fully compatible with Basic, printer output etc.

The new release Videobasic 64 is an extremely powerful software package for graphics and sound. Very few of the Videobasic commands have been altered, but so much more has been added. Any programs which you may already have written in Videobasic can readily be incorporated into the Videobasic package for alteration and extension.

## Graphics

The VB screen corresponds to normal graphic conventions with the X axis going from left to right and the Y axis from bottom to top. You may work in SCREEN or MULTI modes and the commands include draw, dot, box, block, circle, clear (for type) and fill. When the circling command is used the x or y factors may be modified to square the circle in either direction to give ellipses. Text to screen is available in four different sizes.

The fill command can be used in normal standard colour or in an extended format to produce pattern filling - you design your own pattern in a very simple manner, add the data to the fill command and get results in a flash. Most commendable. Should you make a mistake in the filling location, the stop key will do just that.

To facilitate copying portions of a graphic screen, a region command is included, copying areas of the screen from one area to another among other features of this command screen copying is possible.

## Sprites

No problem here, sprites may be handled in Data form. Has or hit-mapped on screen. Fifteen possible sprites may be used with 15 different slots. Using standard commands, sprites may be placed and moved around at will, expanded, rotated and turned on or off. Once defined, they can be recalled easily from memory.

## Turtle Graphics

VB's turtle graphics are very powerful and respond to direct commands such as move, turn, turn to etc. Using the 'go' command makes the turtle disappear and graphics run at a very fast rate. Bracketing commands allow repetition of moves and there is a list in this section alone. All commands may be interlinked to the graphics mode, so there is even more scope here.

## Music

This is fully documented and music may be entered in two ways to allow simple 'sounds' (explosions, siren etc.) or, more commendable, very pleasant single voice music of high quality. This can be used as a Easter interrupt to play along with your programs.

All this is fully interlinked to Basic and there are SCREEN DUMP facilities to tape or disk, restoration of graphic display, HARDCOPY to Commodore, Epson, Gemini or Okidata printers in either small size or full size screen.

## Advanced Features

One outstanding feature of VB is to set up two graphics screens at once.

Blocks of memory are transferred from one screen to another with two 'XFER' commands which are simple to handle; reverse swapping is included and the effects are quite spectacular. A little care must be taken here to avoid crashing the program. Just follow the instructions!

Sprites, graphics, copy handling, pattern designing and filling are all possible with the screen swaps and 'flashing effects' can be produced. If I went into this fully, I'd fill the whole magazine. Suffice to say that all commands are adequately documented.

## The Manual and Tutorials

The manual is well presented and fully documented. Included on the disk are a Demo and three tutorials. For those of you who already have Videobasic, the demo is disappointing; this, however, is adequately compensated for in the materials which may be printed out in the normal 'hot' manner. These are really comprehensive, particularly with reference to the more advanced features of VB.

Well, if you feel like a change from non-joystick-lightgun graphics, have a go at VB. You won't be disappointed (although if you are really attached to your peripherals you may use joystick and lightgun programs in VB, while collision between sprites and between a sprite and background pattern can be detected).

In your distribution, 'run-time' version of VB (royalty free - stand alone), the worksheet LIST, SAVE or MODIFY your program.

This is an excellent, well designed program. It may seem expensive, but you get a lot for your money, particularly as Abacus Software in America and the current exchange rate is handsy designed for the British consumer. Have a go!

## Footnote

Adamsoft: 18 Norwich Ave, Borehole, Luton MK11 5JZ. 0706 520404. Price: £24.95.

128

an affordable program for the Commodore 128, the software that lets you create a program that can be run on any Commodore 128 computer. The program is easy to use and can be run on any Commodore 128 computer.

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*C16 owners quite often mean that there isn't a lot of software around for their machine. Well, now's your chance to increase your software collection with a copy of C16 Greatest Hits from Melbourne House.*

**M**elbourne House who are well known for many of their Spectrum and C64 games have put together a collection of games programs for the C16. On the tape, which retails at £9.95 you will find a version of the original computer adventure ingeniously titled *Classic Adventure*. Secondly you'll find a version of that classic arcade game *Roller King*. An extremely difficult platform game titled *Dark Tunnel* and an action packed arcade adventure titled *The Wizard and the Princess*.

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## How to Enter

Study the pictures on this page. There are several differences between them. Mark the differences on the picture attached to the coupon, fill in your name and address pop it in an envelope and send it to us. Mark the number of differences very clearly on the back of

your envelope, if you don't then your entry will be void.

## The Rules

Entries will not be accepted from employees of Argus Specialist Publications and Melbourne House. This restriction also applies to employee's families and agents of the companies.

The How to Enter section forms part of the rules. The editor's decision is final and no correspondence will be entered into.

75

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**Abstract**

1000



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# Club 128

*Your Commodore and CompuNet keep 128 owners in touch with each other and with what's going on on line.*

*By Neil Day*

**W**andering around in CompuNet can be like a stroll through a well-laid-out garden. You are oriented from place to place by the ever-changing vista! However, for a user in a hurry, for example on a quest for a specific piece of information, the tree-like structure can become a tangle of branches constantly catching you up in irrelevant frames on, even more infuriating, leading you back over well-trodden paths and displaying frames you have already seen three times over!

For instance, if you GOTO ICPU0 in search of a list of hardy-numbered software, you would be lucky to find it by exploring the directories. There is, for example, an excellent little utility called ISOLATOR (344824) which lets you set and paste sections in and out of basic programs. You might be tempted to look for it in the directory labelled "SOFTWARE" on the opening list of ICPU0 frames.

This is well worth an examination incidentally, but you won't find the ISOLATOR program there. To find it by trial and error, you would have to look at the following directories in turn:

GENERAL INFORMATION, TECHNICAL TIPS, C64, SOFTWARE, and SHORTSTORY: your chance of finding that particular sequence is about the same as the proverbial combination of monkeys, typewriters and the works of Shakespeare.

There is, however, an easier way. Editors of sections such as ICPU0 and ICC put a lot of time into making information accessible. Both these areas have indexes; in the case of ICPU0 the frame labelled CONTENTS gives you a fair idea of what the items is about, as well as its location.

GOTO INDEX gets you to a directory frame of indexes for a wide range of topics. The most general of

these indexes is the "HIGHLIGHTS INDEX": an 11 page summary of the main topics covered on CompuNet, with the frame number or word you need to type after selecting GOTO on the dashboard menu. You'll probably be referring to this index so frequently, that a printed copy is a must.

One potential trap with these very helpful lists is due to the rapidity with which things change on CompuNet. Be prepared for occasional "RECORD DOES NOT EXIST" messages. These frames may have expired, or the number may have been changed to a more easily remembered word. A

provide, in a few pages, enough suggestions to set you off happily exploring. Wino (GE81) seems to spend a lot of time looking out for exotic uploads in the Jungle and his recommendations are always worth checking. GOTO NEWS will find you those "newsletter" frames. GOTO C64M68 and read the CompuNet news pages. These get updated about once a week by GE81 and are a similar source of interesting recent uploads.

With a little perseverance the initial hassle of finding your way around fades, but remember often it is exciting just to explore the huge amount of information at random. When you find something particularly good or bad, remember that the uploader has put a delicate ego on the chopping block hoping to have it slashed a vote of 1 can work wonders! But even a swift kick is preferable to being ignored!

CRUT95 has come up with a very novel use for the interactive side of CompuNet. Under the "News Update" directory in the YOUR128 area you'll find some Opinion Polls (37223). You show your opinion on a range of proposals by voting. CompuNet's version is popular democracy at work. The idea has met with a mixed reception: one letterhead CRUT95 saying "Club 128 is about computers not politics, there's no place for 'politics here'.... looks like we'll just have to stick to sex and religion. The opinion poll questions for rating computer magazines seem to have drawn more votes, and less disapproval than Mr Editor, how Commodore had straight since the last time I looked!"

While on the topic of Computer magazines, be sure to look into the Four Commodore directory (GOTO YACB4) for some very welcome additional more programs listings from the magazines being uploaded.

79



recent news item about Alphabetic GOTOS, as these are called, suggested that you type in a few guesses, having used this new form of combined cryptic crossword and mind-reading exercise I warn you it is not easy!

An excellent source of information about recently uploaded material will be found in the GOTOS directory. Select GOTO on the dashboard the type "GOTOS". People who actually want their uploads read are taking advantage of this innovation by uploading a short notice in the GOTOS directory telling users that their offering is available.

Another way to find out about recent additions to CompuNet is to read the excellent "newsletters" that give a review of what is available. "The Jungle News" or "Wino's Jungle" will

# JOHNNY REB II

The American Civil War is raging at its height. The Union and confederate armies are recruiting anyone old enough to hold a musket. It's a time for brave and fearless men. You are Johnny Reb—one of the bravest of them all.



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LOTHLORIEN

# Games Reviews

*There are times when you need a break from the serious side of things, so Your Commodore brings you the latest choice in Commodore games.*

## COLLAPSE

**C**ollapse is an extremely apt title for this game. I nearly did by the time I'd fathomed out all of the controls for it. Of course if you've a quicker mind than I have you won't have too many problems. It isn't that there are lots of buttons or keys to remember as you use a joystick, however each position performs a different action and further options are added by combining the fire button with a direction.

Anyway, before I put you off trying the game, I'd better tell you what it is about.

The main character is a little teddy bear, at least he looks like one on the cassette sleeve, called Zen. Zen's aim is to change the colour of a sequence of sticks from grey to blue and then set up a chain reaction to collapse them all. Of course, during his task he doesn't go unharmed. On each screen he is approached by objects, which look like multi-coloured pumpkins and hovering hedgehogs, which eat up his time if he comes into contact with them.

Each screen presents a different pattern of sticks. Bridges help Zen climb around the screen so that he can reach all of the sticks. The bridges at first glance do seem a little low and far between. Fortunately Zen is not an ordinary, wingless Teddy as portrayed by Paddington, or for the more mature readers, Teddy Robinson, because he can turn himself into a magic bear, yow! Once Zen has his magic turned on he can start to build his own bridges where he needs them. To do this you have to press the fire button, turning him from an ordinary to a magic bear, then press the button again and move the stick in the direction that you want to lay, or

remove, a bridge. Now Zen can climb on it to reach more sticks.

To make the game still more complicated, Zen can't change the colour of the sticks while he is in his magic mode. Turning back to normal is simply a matter of pushing the stick forward and then carrying on as before.

It is possible to detain the aliens for a while, giving you a little more freedom as you wander around the screen. To do this you must turn Zen into his magic mode, pull back on the joystick and watch the magic dust appear. If the aliens run into this they will be trapped for a moment or two gaining you extra points.

Once all sticks are blue, or before if you feel like it, you can start to collapse the structure. This is done by carrying out the procedure for building a bridge, only this time moving the stick in the direction of a stick. This starts a domino effect causing the sticks to tumble down. Bonus points are awarded if you can collapse all the screens in one go.

I don't think you'll get bored with this game for quite a while as there are no fewer than 96 screens to tackle. The fact that the controls are a little complicated, the few examples I have given above this, may put a few people off, though I must admit you do pick them up fairly quickly.

If you can stand the strain this game is extremely good value at £1.99. If you start pulling your hair out you can always give it to the kids to shut them up for a few hours. **J.G.**

## TOUCHLINE

Title: *Collapse*. Supplier: *Firebird, Wellington House, Upper St Martin Lane, London WC2H 9BL*. Price: *£1.99*. Machine: *C64*. Compatibility: *NTSC Graphics: NTSC Playability: VHS Folder: N/A*

## MISSION A.D.

**I**ndustrial espionage is a dirty business and agent 1Y was none too pleased at being ordered to break into Oslo's Liverpool headquarters. He much preferred killing to hunting down secrets.

And the mission had soon gone sour on him too. Dugging into a small cubicle in order to avoid a security



guard, he heard the door slam shut behind him. No amount of brute force or any number of bullets had any effect on the door. The only objects of interest in the hallway were those buttons. A quick prod of them produced a sensation somewhat akin to being in a lift and time machine simultaneously. Finally, the machine stopped and another button opened a door into a room which seemed suspiciously like a library.

Pressing only to obliterate a passing robot with an apparently hostile intention, agent IV started to look at the books when a voice informed him that he had precisely 16 minutes to find and destroy five creatures. A picture of them appeared on the small screen and although they looked like men, IV knew that they may well be humanoid.

Unfortunately, they looked nothing like the droid that he had just blasted and already, his time was beginning to tick away. It wasn't quite the mission that he had in mind but it did involve lots of violence and there didn't appear to be much of an alternative.

The screen shows two levels of the area that you are in and you can see various droids, robots and humanoids running around and firing. Lifts move you between levels and the first thing to note is that although you can only see two levels on screen, an area may consist of several so that although you are on top of the screen, you may still be able to take a lift upwards. Teleport systems allow you to move to different areas and there is an elementary radar system showing the approximate location of your targets. The only hint that you have is not to blast anything that doesn't try to blast to you.

Your man is nicely animated as he runs round the library, cathedral and parks and the music helps maintain the atmosphere. Mission A.D. is a nice blend between shoot-em-up and arcade adventure and there is definitely a feel of "I'll just have one more go."

G.H.



#### TOUCHDOWN

Title: *Mission A.D.* Supplier: *Dala, Wallygun House, Upper St Martin Lane, London WC2M 9DL.* Machine: C64. Price: £9.95. Originality: 8/10. Graphics: 8/10. Playability: 7/10. Value: 7/10.



#### ARCANA

King Valasquil (the baddy) rules the Northlands from the castle Arcana. Deep within the castle is the Dark Chronicle, the most powerful book on Black Magic ever written. Naturally, Valasquil would love to know what secrets are inside the book but there are problems. The clasp of the book is sealed and the special incantation that is needed to unlock it is only repeated when the light of Shedding Moon falls upon it. As that is tonight, the elves of Elatara have sent you to find and destroy the book and you arrive at the castle with only two and a half hours to go before the moon rises.

When you are as evil as this king, you don't leave anything to chance and so the book is heavily defended. The main line of defence is the small matter of seven demons. Fortunately, there also happens to be seven amulets which will protect you if you can find them. The second line of defence are the king's many minions who are hell-bent on sapping your energy. You can counter these by firing bolts of magical energy supplied to you by the elves.

The castle itself needs to be explored thoroughly. Most of it is a series of maze-like corridors but there are also some 50 special rooms spread over the four levels. These may include useful items or help you if you are carrying a specific ally. Therefore, if nothing happens when you first enter, the chances are that you will need to return later. Moving round the castle is straightforward. Some doors are open, some locked and some just stuck so that they open when you blast them. There are stairs leading to different levels and an ancient teleport mechanism to be found and used.

Although it bears a passing resemblance to Ultimate's arcade adventures, I found that Arcana had a better gameplay and was much more addictive. Definitely worth a look if you enjoy this type of game.

G.H.

#### TOUCHMAN

Title: *Arcana.* Supplier: *New Generation, 2-4 Vernon Yard, Pancrathie road, London W1T 2BN.* Machine: C64. Price: £7.95. Originality: 7/10. Graphics: 8/10. Playability: 9/10. Value: 8/10.

## HOODOO VOODOO

**A**s usual, there is a decided dearth of superheroes. In fact, you are the only one remaining and have been charged with destroying the Hooptopog (I kid you not) from Koolha IX.

Your first task on arriving on the planet is to pick up and deliver the seven Daggers of Power to the portal opening. There are no problems in actually locating the daggers as a large arrow gives you the all important clue. You can only carry one dagger at a time and you must avoid or blast assorted nasties as you travel through the hallways. The only problem here is that if an alien happens to be hiding behind a pillar when you pass behind it, you lose a life without knowing or seeing what hit you.

If you manage to complete the return journey seven times without dying, you get the chance to try and pick up pieces of garbo and crosses. It is just as well that you are told what you are looking for as the necessary items just happen to be invisible. No subtle hints here! Should you succeed in breaking the curse, you get a crack at the Alien Possessor. He, it would appear, is not exactly over-endowed with grey matter, for whilst he has carefully made his guardians impervious to the blasts from your gun, he will expire under a hail of bullets and not surprisingly, it is his destination that concerns you most.

Hoodoo Voodoo is a below average shoot-em-up and even at its budget price does not represent particularly a good value for money. **G.H.**

### TOUCHLINE

**Title:** *Monster Fandoo*. **Supplier:** *Big Byte, Fantasy House, Explorer Place, London WC2N 7NR*. **Machine:** *C64*. **Price:** *£2.99*.

**Originality:** *4/10*. **Graphics:** *4/10*. **Playability:** *4/10*. **Value:** *3/10*.



## DROIDS

**D**ue to an unfortunate accident involving solar flares, all computers on the prototype warship *Android* are out of action and the ship's defence mechanisms have automatically been switched into red alert battle mode, programmed to destroy anything and everything that comes into range of

its detectors. This could just prove to be a little embarrassing as the planet Venus is only 24 hours away. Because of this, you, as an agent of H.A.A. (Holographic Law Enforcement Agency) have been briefed to shut down *Android* whenever the cost.

By means of a sophisticated teleport system that the computer is incapable of overriding, you have been beamed aboard the ship and must attempt to close down each of the docks in turn. In order to do this, you must first climb the dock of the droids and then access a terminal and attempt to discover the correct free port code. You can then move to the next dock by means of an internal teleport system.

The droids must be shot several times before they are des-



troys and have an annoying tendency to fire back whilst you are attempting this manoeuvre, depleting some of your energy if you hit. You must also avoid bodily contact with them as their defence mechanisms interact with yours causing a similar energy loss. This is somewhat annoying as when you move off the edge of one screen, you have no way of knowing the location of the droids on the next one. If you happen to walk right on top of him, it tends to be game over time (you only have one life).

Having destroyed the droids on a particular dock, you can try and close it down by accessing a terminal. Here you go into a mini-mastermind game. The code is a series of five bytes, which can be either set or not. You have five goes to find the correct sequence. After each input, you are told how many bits have been set correctly. The terminals can also be accessed for other reasons. You can get a map of your surroundings (side and top views) and also attempt to gain some extra energy. This is not very well implemented and spoils an otherwise enjoyable game. The idea is that the energy packs must be dropped into gaps in a series of sliding blocks. If you succeed in getting the energy from top to bottom, it supplements your total. If you mistake a drop, the energy pack is lost. There are six packs on each dock. The problem is some horrible flickering scrolling which I found most off-putting.

These grumbles apart, *Droids* is a nice mixture of action and strategy. It would be ideal for someone who found *Impossible Mission* a bit too hard.

### TOUCHLINE

**Title:** *Droids*. **Supplier:** *AmigaSoft*. **Machine:** *C64*. **Price:** *£7.95/£9.95 overseas*.

**Originality:** *5/10*. **Graphics:** *4/10*. **Playability:** *4/10*. **Value:** *4/10*.

## MISSION ELEVATOR

**T**he FBI is in a mess. Foreign agents have taken over one of their Central Intelligence Units and are attempting to blackmail the American Government. Unless the White House gives in to the demands, the CIU will be blown sky high. Fortunately, an agent discovered that the bomb was hidden on the 42nd floor of a hotel and also learned the special code necessary to stop the bomb from being detonated. Unfortunately, he was then discovered but he did manage to leave several clues dotted round the hotel waiting for some brave agent to break in.

The hotel is split into tanks of eight floors and before you can move to the next unit, you (as it was you that was foolish enough to volunteer) must discover the location of the key to the emergency exit. This is owned by the porter who will quite willingly give it up if you can find him. This is no easy task though as first, you must search the furniture for a pass key that will let you open all the doors of the hotel and discover their contents. The hotel is also infested with enemy agents who will shoot on sight if you don't eliminate them first. You can also leap and duck out of the way of stray bullets as well as firing from a normal and low position.

The hotel is full of hazards to be examined and explored. You need to find the various bits of password that will help defeat the bomb. There is money to be found which can be spent at the bar or gambled away in a game of dice. Clues are also hidden in furniture although you should be careful exactly what you examine. An electric socket gives a nasty shock if you insist on looking at it too closely and you can also have fun with the fire extinguisher. Movement through the hotel is by a series of lifts hence the title of the game.

Although it sounds fairly simple to play, believe me it's not and you will find yourself getting wasted fairly frequently. The graphics are colourful and quite well animated, especially the enemy agents. A nice original arcade adventure that even though it is very difficult to finish, is very simple to play and always demands 'just one more go'.

G.H.



## TOWNLINE

Title: Mission Elevator. Supplier: Microsoft 4 Mercury House, Calver Park, Aldermaston, Berks. RG7 4JW. Machine: C64. Price: £9.95/12.95 (incl. VAT). Originality: 8/10. Graphics: 10/10. Playability: 5/10. Value: 5/10.



## TOMB OF TERRARASH

**H**ave you ever played any of those games which are set inside an ancient tomb where there are statues and weird creatures and of course, the inevitable mummies?

There is another in that genre and it lacks a lot of originality and is really quite tedious.

Once you've worked out how to play the game and how the controls work you're halfway there.

The character which you control (looking absolutely nothing like Indiana Jones) can walk left and right and jump. You'll need to get the hang of jumping as soon as possible because there are some very wide gaps to negotiate. If you fall down the stair gaps it doesn't matter but if you fall in a trap then you dissolve very quickly and lose a life.

You can also walk behind the stairs if you jump as you are approaching them so there aren't as many dead ends as first impressions create. If you stand behind the stairs then you're safe from the mummies too. This is quite handy as you can wait till there are less of them around to kill you before you cautiously emerge.

Other traps include bars which come down on you just as you walk beneath them and giant saws which do likewise. However, these can be slowed down considerably by mowing buttons in the ceiling of the tunnel. There are plenty of these around all operating different traps so the best thing to do is hit them whenever you see them.

You may find that this game appeals to you, but on the whole I think it's far too tedious. Even with the limited memory available I think that more imagination could have gone into it.

M.C.

## TOWNLINE

Title: The Tomb of Terrarash. Supplier: Analogic. 39 Suttons Industrial Park, London Road, Reading RG7 4JZ. Machine: C16. Originality: 4/10. Graphics: 5/10. Playability: 3/10. Value: 4/10.

## SPEED KING

The smell of petrol, the sound of powerful engines revving, the odour of leather and sweat and the pumping of your heart as you await the starter's signal. The crowd is tense, the engines roar and the main-machine room moves as one at unthinkable speeds.

Motorbike racing has had a lot of coverage in the computer games market but there is always room for a better version of an old formula and Speed King has a lot going for it in terms of excitement and addictiveness.

The lay out of the game is simple. You can choose from four courses: Hochendorn, Monza, Silverstone or Paul Ricard. They all look similar though the sky and track are in different colours and some are slightly longer. Not being familiar with these famous circuits I cannot tell whether they are authentically reproduced here.

Once you have chosen your course you appear at the starting line and off you go.

At the top of the screen is all the information you need to check up on your progress. You are told your speed, gear, time, which lap you are currently on and your position in relation to the other 18 riders.

To get your speed up you have to work your way to top gear. Maximum speed is 240mph. Once you have the hang of the steering and you have perfected your overtaking technique then there should be no stopping you. Having said that, I haven't yet completed a race without coming off. When you do crash you disappear in a ball of flame and then miraculously reappear unharmed to take up the challenge where you left off.

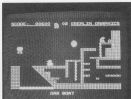
One quite major criticism of this game is the ease in which you can hold the lead. This may sound pretty but once you have the knack of controlling your bike it is a fairly simple matter to put yourself ahead of the field and stay there. As long as you keep your speed above 200mph there's no way any of the other bikes can catch up. In one race I actually took the lead in the first lap and held it for the complete five lap race. I never saw another rider! This means that the circuit gets a little tedious especially as you don't even seem to be able to lap anyone.

Having said all this the game was a big hit in the office. It's possible to set up some quite good tournaments by attempting to beat the lap record. I've played it a lot and I'd play it again since setting new objectives - not crashing at all, beating the course record, or your friends best time - gives it

more of a lasting appeal than perhaps would be expected. Don't forget too that it's only £1.99!

**TOMMYDINE**

**Title:** *Super King*. **Supplier:** Microtronic, 8-18 Paul Street, London EC2. **Price:** £1.99



## MONTY ON THE RUN

**M**onty Mole, that eternally endearing little character from Gremlin, is back in this game for the C16.

Having seen the 64 version some time ago, I was looking forward to this and it wasn't a disappointment.

The graphics are quite colourful and effective and the little character, although looking more like a short, stout toady bear than any mole I've ever seen, is quite agile and can take any number of falls seemingly without physical damage.

As a platform game, it is, of course, full of all the usual hazards. There are numerous floating alien type beings who must be avoided. In fact it is advisable to give them a very wide berth since some of them seem to have a force field around them which is as deadly as the buster themselves. Others can be approached without much danger except when you actually touch them. When you die there is a ghastly crunching sound that makes you feel as if all your bones are being ground to pulp. Not very nice.

One danger worth watching for is the piston which shoots down at irregular intervals and squash you to pieces. On one screen it is impossible to avoid this untimely death if you walk on at the wrong place. I managed to do so exactly the same place three times before I sorted this out.

Despite the fact that this game is not really original (think of a platform game and all the classic qualities are here), it has an addictiveness which is difficult to explain. If you've got a C16 and a bit of spare cash then I thoroughly recommend this game. Treat yourself. **M.C.**

**FOUCHAMINE**

**Title:** *Monty on the Run*. **Supplier:** Gremlin Graphics, Alpha House, 10 Carrer Street, Sheffield S1 4PS. **Price:** £6.95. **Machine:** C16. **Originality:** 5/10. **Graphics:** 9/10. **Playability:** 10/10. **Value:** 9/10.





## BEYOND THE FORBIDDEN FOREST

Connoisseurs of C64 games may remember the excellent *Forbidden Forest* of a couple of years ago. Well, you guessed it, this is the sequel. For those of you not lucky enough to ever the original the game went something like this. You armed with your trusty bow and arrow must run through the forbidden forest avoiding and killing the monsters that are out to get you. The enemies appeared in waves and such creatures as giant frogs and skeletons were also you.

When this program first appeared a bit of an outcry developed in some of the magazines since the graphics in the game were extremely gaudy, especially the spouting blood when you killed or were killed. Well you'll no doubt be pleased to know that *Beyond the Forbidden Forest* offers the same amount of horror but with an even better game.

According to the instruction sheet, *Beyond the Forbidden Forest* is a game written in four dimensions. The four dimensions are described as the following. Left and right movement as you would expect and the passage of time as with the original game, but now you can also move into and out of the background. This means that instead of simply running left and right in front of all the objects it is now possible to run behind them to hide from a monster or simply charge into the background to attack a particularly ugly looking monster. This added dimension certainly adds something to the game and makes it all the more difficult to play. One extremely nice touch is the way that both you and the monsters get smaller as you move 'into' the picture, the fact that you get smaller the further away you are is something that many games overlook.

As previously mentioned you are armed with a bow and arrow. Controlling this at first is a little bit of a problem but you soon become used to it. The reason that it is a little trick is that on a press of the fire button your aim is taken alternately higher and lower, whatever position you release the fire button in is the height that your arrow is fired at. Once you are used to this then control is excellent though at the start of the game you will no doubt find your precious arrows flying off nowhere near the monster.

As for the monsters, well you couldn't hope to meet a more disgusting bunch. Firstly you'll have to face the worms which pop out of the ground with a frequency that tells you that they certainly don't like you. Get too close to one of these and you're sure to be pulled under ground for dinner. Watch the screen and you'll soon see the worm re-appear

and regurgitate what is left of you back into the playing area, I told you the game was blood thirsty.

Once you have dispatched the worms it's on to the dragonfly. Again take careful aim before this enormous sized fly carries you off for its dinner, accompanied by the usual gory effects of course. Following it on to face the chimera.

As you kill a monster then some mysterious power gives you a golden arrow, to use later in the game. Should you loose a life then arrows are taken away and you are re-incarnated to fight once more.

Once evening arrives, and if you have enough arrows, then it's off to fight the monsters in the underground caverns. Firstly you have to face the bats swooping at you from all directions. Next comes the hydra, a four headed monster breathing fire at you from each mouth, not a pretty sight. Should you ever defeat this then it's on to face the ultimate monster 'The Demonogon', firing bolts of fire at you from each eye this is a monster that must be dispatched very quickly, if not then it will certainly dispatch you.

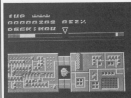
Playing *Beyond the Forbidden Forest* is rather like playing the part of the hero in some epic horror movie. The animation of the monsters is excellent and the atmospheric music certainly helps set the scene.

If you aren't squeamish then I suggest that this is one game that is a must in your collection. However, don't play it too late at night, you never know what might happen.

**FOOTCLINE Name:** *Beyond the Forbidden Forest.*

**Machine:** C64. **Supplier:** US GAMES, Units 2/3, Halford Way, Halford, Birmingham, B4 6AN. Tel: 021-256-1382.

**Originality:** 4/10. **Graphics:** 8/10. **Playability:** 8/10. **Value:** 8/10.



## W.A.R.

Swirling space battle games certainly received a boost in popularity when *Uridium* appeared. *W.A.R.* is certainly a variant on this theme complete with gigantic scrolling spaceship, enemy craft hot on your tail and of course lots of things to shoot.

As first glance *W.A.R.* does seem to offer a great deal of excitement with an excellent swirling background and lots



of enemy fighters, its only after playing it for a short while that the tedious sets in.

The actual scenario for this game is a chain of cylinders, the inside of which is a complete city. Your job is to destroy each of 20 cylinders each of which has a specific purpose. When your ship enters a cylinder a self-destruct timer is initiated. After this timer has run down an escape portal opens for the money to escape through, you must get to this and follow them through before the ship cylinder blows up.

Actually making it to the portal is, on the first level anyway, a piece of cake. The enemy fighters aren't particularly nasty and aren't that quick. However once you reach the portal things are a little different. Before you can go through the portal you must de-code the colour lock. Not an easy task. To decode the lock you must shoot all of the coloured squares that re the same colour as the top line of the screen. Oh, and the blocks are moving. After many hours of playing I must admit that getting through the lock is extremely difficult it was nearly impossible. I can't help thinking that the programmers simply added this on top of the game to make life a little more interesting, after all the first level is extremely easy. It is extremely irritating to find that you survived a level only to loose your ship because you can't get past the lock. I nearly lost a life while burning it out on the cylinders.

In my view W.A.R. is a game that had a lot of potential which failed to come through. Summing up best done by quoting someone who played the game by saying: 'It's a 2nd class Urinal'.

**FOURLINE Name:** W.A.R. **Price:** £8.95. **Machine:** C64. **Supplier:** Marnock, Marnock House, Bay Terrace, Penmoney Bay, New Sussex, BN24 4EB. Tel: 04323 768264. **Originality:** 4/10. **Graphics:** 8/10. **Playability:** 4/10. **Value:** 4/10.

## MIAMI VICE

Programs based around TV or film titles are bound to sell on their titles alone. This is obviously a good thing for the software houses, but I can't help wondering how the buyers will feel if the game doesn't live up to their expectations.

Miami Vice, as its name suggests, is based upon that extremely popular TV series of the same name. Crockett and Tubbs have heard that a shipment of contraband is due in town. Your job is to get out on the streets and find the contraband.

You are supplied with a set of possible meeting places for the gangsters involved with this caper, together with the times that the gangsters may be there.

Now appears the first problem. You have a drive around town and try to reach a meeting place where the gangsters may be, at the correct time of course. Having worked for quite a while in this town you would have thought that you would know their way around. Not so, finding the correct bar is a feat in itself, accidental getting there at the correct time. My advice is to spend your first few hours playing the game making a map. I say hours, as the playing area is extremely large and it is very difficult to drive around.

Orman has obviously trained this, since, a few days after the game arrived, they sent me a map of the city with all of the bars etc. marked upon it. This was a godsend as I must admit without it I would have died of the game extremely



quickly and probably never have got as far as meeting a criminal.

Driving around the town presents quite a big problem as there seems to be something fundamentally wrong with the design of the car. If you were driving down the road with a car of your left and you wanted to turn right, you would think that there would be no problems. Wrong, turn your car to the right and your back end will swing out skidding the other car and sending you back to the start. If you should drive close to the edge of the road and try to turn away from it the same happens. This makes it impossible to turn in certain circumstances, the only option open to you is to crash. Now I don't know about you but I've never been in a car that suffered from this problem.

Once you actually reach your destination, if you overdo, you have to be very careful of the time. If you arrive too early the crooks will spot your car and drive off. If you enter a meeting just as it starts then the crooks will have fled leaving the evidence behind. If you enter four to eight minutes after a meeting has started then you may find a crook carrying evidence. If you enter eight to 12 minutes after a meeting has started then the location will be deserted, though if you leave quickly enough you may spot the crooks in their getaway car and give chase through the streets firing at them out of your window.

Overall control of the game is quite simple, even if the actual game play is complicated, though a large number of options are available from the joystick (shoot, leave car etc.). The graphics, though not brilliant, in the road scenes are adequate with a superb smooth scrolling city background seen from above. The meeting places, bars, are quite well detailed and searching through the rooms looking for the crooks and evidence is quite atmospheric.

Fans of the TV series will no doubt turn up their TV's volume as the familiar TV theme and rock music is played by the computer, played at a high volume this does add something to chasing around town looking for crooks.

I can't help thinking that due to the fact that the game lacks a little in playability it will hold your interest for little time. Miami Vice suffers from a severe case of 'nice idea, shame about the game'.

**FOURLINE Title:** Miami Vice. **Machine:** C64. **Supplier:** Ocean, Ocean House, 4 Central Street, Manchester M2 5NS. Tel: 061-812-4613. **Originality:** 9/10. **Graphics:** 9/10. **Playability:** 4/10. **Value:** 4/10.

## POWERPLAY

There have been many attempts to bring question and answer quizzes to computer screens but most have tried to copy Trivial Pursuit too closely. Powerplay formulates the puzzle board game to provide a new and exciting recipe.

The screen display is taken up by a chessboard matrix in a classical setting, like Ancient Greece. At the corners of the board stand two pieces and the idea of the game is to conquer your challengers by superior general knowledge and fast reflexes.

The questions appear beneath the board and the four optional answers appear. Whichever option you think is correct can be selected by keyboard or joystick and the answer affects the boardgame.

A correct answer allows you to move one of your pieces one square on the board or to increase its power. When two opposing pieces are on adjacent squares a challenge can be issued. The combatants must prepare to spot the correct answer to randomly selected questions and the one who wins diminishes the power of the opponents piece. If the pieces are both very strong, the speed battle must be repeated on successive moves until one of the players decides that it is time to run for cover before his character is destroyed.

Flashing squares around the board act as a teleport device which allows fast movement around the board to another flashing square. This is especially useful for a fleeing piece, as long as it doesn't take it to a square near an even more powerful foe.

The questions are varied and taxing with those not available with the game. Also included is a question base compiler which allows you to construct your own quiz. This is especially useful for families where children would find the questions far too difficult. A quiz control around nursery rhymes or even school work would turn the drudgery of learning into a pleasure.

When we played the game in the office the interest was high with everyone trying to get in on the action. This is the supreme accolade which few games seem to achieve and even fewer manage to sustain. Perhaps its addictive qualities derive from the ability to dudder your opponent with superior knowledge, or even by successful guesswork, but it certainly has pulling power.

The graphics are quite nice with the pieces evolving from a lower warrior towards a top ranking minotaur. Once the higher evolution has been reached further correct answers merely add to its strength and very powerful battles can be

joined at the climax of the game.

Although the game is well devised and professionally executed I still don't feel that the ultimate game of this type has been achieved. Powerplay goes a long way along the road towards the definitive work and as it stands is on a par with US Quiz's Mind Pursuit. Together these games are streets ahead of their rivals but the road is long. **B.D.**

**FOURWHEELS Title:** Powerplay, **Supplier:** Acorn.

**Machine:** C64.

**Originality:** 4/10, **Playability:** 4/10, **Graphics:** 4/10, **Value:** 4/10.

## PARALLAX

**Y**ou, together with one of the Earth's most eminent scientists have landed on an artificial world. Everything was going well until you discovered some secret information that showed that the inhabitants of this world were planning a surprise attack on Earth. The once friendly natives immediately turn hostile and it is up to you to find your fellow scientists and an Interplanetic Teleport in order to make good your escape.

The planet is divided into five main zones, alpha, beta, gamma, delta and epsilon and there is one of your friends in each zone. There are many other scientists in each zone and you must capture or kill them in order to learn about the password that will admit you to the next zone. These are to be found in language which also contain computer hacks, traps and intelligence units. These can only be entered on foot and so it is necessary to leave the relative safety of your ship and wander round, making sure that you possess enough oxygen and ammunition for your journey.

As you eliminate the scientists, so you can pick up their data disks which serves you two useful purposes. Firstly, it allows you access to part of the code, but it can then be exchanged at the bank for a number of credits with which you can then stock up on your requirements. You need to capture one of the scientists but he will refuse to help you unless you have acquired some drugs and use them on him.

Having explored your immediate surroundings on foot, you will want to move elsewhere so it's back to your ship and ready for take off. Your craft is highly manoeuvrable and can fly under as well as over certain parts of the superstructure. This is just as well as you are under constant attack from the enemy forces. You can gain extra speed by flying through a black hole and can teleport to another part of the zone again by flying over the appropriate unit. You will certainly need to activate your shields and remember to put your landing gear down before you land again.

Parallax is a fast action packed shoot-em-up that will certainly appeal to fans of the genre although I felt that the different elements of the game didn't quite fit together properly. The graphics are certainly very slick apart from an appalling opening sequence which seems designed to induce fits of epilepsy with its strobeoscopic effects. **G.H.**

**FOURWHEELS**

**Title:** Parallax, **Supplier:** Ocean, Ocean House, 4 Central Street, Manchester M2 3PS, **Machine:** C64, **Price:** Cms 48.95 804 £12.95.

**Originality:** 5/10, **Graphics:** 4/10, **Playability:** 4/10, **Value:** 4/10.



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- [illegible]

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**Abstract**

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88. [www.fishbase.org](http://www.fishbase.org) accessed 25.09.2009

**TABLE 1**

**Case 1: The Purgatory Fall**  
 1. **Problem:** A person is in a state of purgatory, where they are neither in heaven nor hell, but in a state of suffering and torment.

**EM 7** for **Aluminum II** Chromatography

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...the ... ..  
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**24.1** *Test Planning* **24-1000**  
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1. **Identify the main idea of the passage.**  
 2. **Identify the supporting details.**  
 3. **Identify the author's purpose.**

These findings suggest that the use of a single, standardized, and validated instrument to assess the impact of the intervention may be more appropriate than the use of multiple, non-standardized, and non-validated instruments.

1. **Policy:** The company will not  
 2. **Policy:** The company will not  
 3. **Policy:** The company will not

1. The first step is to identify the problem. In this case, the problem is that the system is not working properly.

[illegible]

# Pick of the Sticks

*If all that zapping has finally left your joystick in a state of collapse then read on to find out the best buys for games players.*

*By Eric Doyle*

**W**e've all heard that a bad workman blames his tools but there are occasions when the workman may be bad because of his tools. Choosing a joystick is far more than just wringing along with the latest trend. Ponder on the ergonomic complexities and you'll soon appreciate the art of the joystick maker.

Firstly there is the problem of which hand to use. Left-handedness is no longer considered to be a sinister defect so the perfect stick should be symmetrical. In simple terms this means that if the fire button is not centrally positioned then there should be two of them.

The second consideration is a little more tricky because it depends on your style of play. Most people seem to prefer holding the base in their weaker hand while wiggling the stick with the other. Problem number one is how large is the human hand? Obviously there is no fixed rule, all hands are different and so this area is open to much speculation.

As a student I worked on a Kit-Kat production line where I learned that the thickness of the chocolate bar is a tenth of the span of the average adult hand. As a packet I knew that a handful of Kit-Kats would slot nicely into a box, designed to hold 10, which made the job extremely easy. What if my hands were not within the parameters of averageness? The result would be cramp and aching muscles.

So it is with joysticks. Choose the wrong size and your gameplay will suffer.

Finally, we must consider the sensitivity and robustness of the sticks manufacturers. Robustness is essential, after a hard session of alien bashing, it is very irritating to find that the ultimate high score has been missed because the stick has become detached from the base or because one of the switches has failed. Some people really give the control unit a lot of wack while others prefer delicate movements. For the former a highly robust but insensitive stick would suffice but for the latter a more subtle unit with less 'throw' would be best.

Unfortunately, most players are joystick bathers but the Commodore joysticks have all proved to lack the

necessary sturdiness. This has left the field wide open for independent companies to provide a range of sticks to suit all tastes.

The Pro-Ace Competition Joystick is probably one of the most physically robust sticks on the market. If you come from north of the Border you'll appreciate that using this beast is akin to stirring good thick porridge. In other respects the stick is beautifully designed. The base is small enough to fit comfortably in the hand and is stable enough to stand on a desk top. The fire button is a centrally positioned bar which can easily be operated by the side of the thumb. This gives a better grip for the supporting hand which is essential because the stick takes some pushing and pulling to make it work.

If you're not into bench presses and weight lifting, the Micro-Ace is a better bet. This is the same design as the Pro-cept for one crucial difference. The internal switches are not the crude leaf switches of the cheaper unit and the Micro label refers to the use of microswitches internally. These not only ease the amount of pressure required but are also less likely to fail.

Other differences between joysticks only become obvious when you delve inside. Take the Barman and Micropro. On the face of it the only difference is the shape of the twin fire buttons. Rather novel square buttons on one and oversize round



ongs on the sides. Plug them in and give them a whirl and one thing becomes very clear, the Micropro stick is sluggish and the buttons less reliable. Added to this the Euresmax has a continuous fire button switch on the back for those games where ammunition is not at a premium.

Both sticks use microswitches but a look inside reveals that the Euresmax has a longer control spindle. This gives better leverage on the switches and means that less effort needs to be applied in pushing the switch contacts around. Compared to the Pro-Air either stick is easier to operate but the base is much larger and small fingers may find it easier to rest the stick on a firm surface.

When is a stick not a stick? This may sound like a nursery riddle but just look at the Wiz Card and the Joy Ball.

The Wiz Card is small, inexpensive and innovative. Instead of the usual macho stick protruding manfully from its base, there is a small pad about the size of a 10 pence piece. This can be operated by the pressure of your finger but is not as sensitive as a traditional stick. Part of the problem is the way the pad is positioned at the front of the card. If the fire buttons and the pad were transposed, the quality of the card would improve. To test the theory I turned my monitor upside down and reversed the card in my hand. Immediately the card felt more comfortable and, despite the eccentricity of the inverted screen, my success rate increased.

As a serious game controller the Wiz Card is not a general purpose unit. Fast action games it behind but its neat appearance does lend it to business software or graphics and music utilities. In these areas I found it



actually preferred it to a joystick on a mouse. Flat on the table it's as easy to use as a doorbell, leaving one hand free to scratch your head or hold your coffee.

Hand-held is not a term applicable to the Joy Ball. The size of the unit makes it desirable to find a nice flat surface. I've grown quite attached to this monster. At first I thought it was all gimmick and no action but a few minutes practice soon proved me wrong.

The Ball should not be confused with the rotating joysticks used on arcade machines. These are just mice lying on their backs. The Joy Ball is just an obese joystick and operates by rocking it in the desired direction. Because you don't have to grip it the strain is less than with a conventional stick and this makes it ideal for anyone with manual disabilities.

I'm afraid that left handers will find the button positions awkward to use but the ease with which the ball rocks does mean that a weak right hand could cope with this.

The array of buttons look formidable at first but they are probably the best selection available. The right hand pair are just normal

buttons but the left pair are rapid fire units. On shoot-on-ups the rapid buttons are superb allowing speedy salvoes to be fired, the other buttons are available for more subtle applications.

To attempt to recommend a joystick from this selection would be a pointless task. It all depends on your needs and physical make up. Personally I prefer the Euresmax and the Joy Ball but I would recommend that you search out a good retailer who will let you try out a range of sticks. The main criteria relate to the sensitivity of the unit and how comfortable you feel when using it. Always make sure that the alerts are going to come off worst at the end of the day.

78

#### Footnote

Euresmax Electronics Ltd, Pinfold Lane, Bridlington, North Humberside. 0262 802547.



# Contributions

*So you own a Commodore? So you've  
written some programs? So why haven't you  
sent them to us?*

**Y**our Commodore is always on the look out for new programs, hints and tips, articles and even regular series. In fact if you have something that you think could be of use to other Commodore owners we want to hear about it.

So if you have got something which you think we may be interested in, how do you go about submitting it to us?

Below you will find a list of guidelines that will help us to deal with any item that you send in to us. We don't expect everybody to be the next William Shakespeare but if you do follow these simple rules then it will make our job a lot easier.

1) If possible all material sent to the magazine should be typed or printed out on a computer printer.

2) All text should be double spaced i.e. there should be a blank line between each line of text. You should also leave a margin of about 10 characters around the text.

3) On the very first page you should put the following:

Name of the article  
Machine that it is for  
Any extras required - disk, printer etc.  
Your name  
Your address  
Your telephone number

4) The top of every page should have the following information on it:  
Abbreviation of the article title  
Your name  
The page number

For example, suppose you had submitted an article on C64 interrupts. You should put something like the following at the head of the page:

Interrupts/J.Smith/1

5) Please make sure that you do not make any additional marks on your text especially underlining.

6) Try and write in clear concise English, it does not have to be a work of literature but it must be comprehensible.

7) On the bottom of each page you should put the word MORE if there are more pages to the article or ENDS if it is the last page.

8) If possible, enclose a listing of all programs.

9) Under no circumstances use a staple to hold the pages together. Use a paperclip instead.

10) Programs should be included on either disk or tape. Make sure that you SAVE two copies of every program so that we have a better chance of loading them if problems occur.

11) Programs under 10 lines can be included in the text. If your program is longer than this you must enclose a disk or cassette.

12) If your article needs any artwork then supply clear examples of what is needed. We don't expect you to be an artist but we do need to see what is required.

13) Photographs, if necessary, must be either black and white prints or colour slides. We can take shots ourselves so don't worry about this too much.

14) Submissions of any length are welcome. If you have a free line routine that you think may be of use to someone else we welcome it just as much as a full blown six part series.

15) Payment varies quite a lot and depends on quite a number of factors, such as complexity of program, presentation of program, number of magazine pages it takes up etc. Payment is generally between £10.00 and £300.00.

16) All payments are made in the month that the magazine containing your article has appeared in print.

17) If we do find your submission suitable for inclusion in the magazine we will write to you giving the name of publication, the rate of payment and an agreement form. Payment return of this form will allow us to use your program as soon as possible.

18) If you want the program returning to you, should we find it unsuitable for publication, then you should enclose a stamped self addressed envelope.

19) The last and most important point to make is 'get writing', we are waiting for your articles.





# Letters

*Your comments on Your Commodore and everything else about computers.*

## Masterful

I have recently obtained a C64 and games are so dear that I switched to buying Mastertronic software.

I have many titles (*Indiana Jones, Spooks, Zaxxon, Elmer, Master of Magic, Ice Palace*, to name but a few) and the quality of them is superb, great instructions, brilliantly designed inlay cards, not forgetting the game quality itself. You get all this for the budget price of £1.99.

I think that Mastertronic deserve a medal for the games they produce.

**Darren Kinsler, Portsmouth**

*Frankly indeed, Darren. Ever thought of a job in PR? Anyone else got a bee in their bonnet about a software house?*

## CP/Mystery

I have a C128 but at the moment the CP/M mode is used very little, as I find it hard to see any programs for it. Where will the software houses bring out databases, wordprocessors and spreadsheets for it. If they have please tell me who they are.

Could you run a monthly page for the CP/M, please, to help us understand it better? I'm glad to see that more 128 programs are now in four Commodore, excellent!

Lastly, What does CP/M stand for?

**David M. Thornton, Dundee**

*CP/M stands for Control Program for Microprocessors. Not very helpful is it? It's basically a system to make file handling on disk a lot simpler. There are several thousand CP/M programs available (it's been going since 1977). Try Software, 3-7 Fortrose Road, Malindene, Berthshire RG6 1BP (tel 0628 73377) for further details. Watch future issues for our forthcoming series on CP/M.*

## Net Profits

Your regular reports on the latest from Compuport and Micromet in Communications Corner has sufficiently whetted my appetite to become involved in the world of communications.

I have a C64 and I wish to buy a modem to use with it. Please could you tell me if a Commodore modem can access Micromet as well as Compuport? Also, are there any other modems available, apart from Commodore's which are capable of accessing Compuport?

Before I go, I would just like to say thank you for producing such a brilliant mag - it's the only one on the market which has interesting and informative articles and reviews, and it's well worth the money.

**S J Adams, Dorchester**

*The Commodore modem is the only one which will give you access to Compuport and Micromet. Before you dash out and buy one, cast an eye over our Club 128 special offer (it's for C64 users as well, you know). Thanks for the kind words and keep enjoying the magazine!*

## Sweet C64?

I bought a new Commodore 64 but I now find that I can't get magazines for it. Tell me why couldn't I get magazines for the C64?

I have looked from shop to shop, also from town to town. I feel that I should have been advised when I first bought the Commodore Starter Pack.

**Wendy Jones, Rhyl**

Please could you inform me if Argus has a computer magazine for the C64? I feel the overpriced Your Commodore really is a waste of time for my requirements with only a handful of pages in each edition. My

view saying overpriced only means that nearly all the mag is useless for me and probably all other C64 users.

I have purchased Your Commodore for five months and have found it far superior to ANY other computer mag (e.g. Commodore User). If a separate magazine could be introduced for C64 owners it would fill a large hole in the Commodore market.

Please tell my story to your readers and see what other C64 owners feel...

**INTRODUCE YOUR COMMODORE C64**

**Kevin Millride, Lestock Hall**

*The problem with producing a C64 magazine is principally one of finances. The user base is not large enough to support a dedicated magazine. I know many readers feel that the C stands for Cimbrella but we are doing our best to ensure that you get the support you need but we also have a growing family of ugly sisters to support.*

## Build-a-Type

In Your Commodore, March 88 issue, you started the software service. Would it be possible to publish 'Build A Better Basic' on cassette tape since it is an extremely long utility to type in? **Graham Blissett, Knapton**

*Sorry, Graham, we don't have the rights to allow us to do this. You'd have to risk the money and back it in yourself.*

## SYS Ease

At present I own a Vic 20+16K switchable RAM pack, but I will be getting a C128 soon. My question is how can I get a small character to run across the bottom of the screen by telling a part of the programme to SYS this.



Created: 11/20/2010 10:00 AM	Modified: 11/20/2010 10:00 AM
Created By: [Name]	Modified By: [Name]

# C64 Autosave

*One of the most enduring problems which programmers face is the loss of hours of work through human or computer error. With this program you'll be able to save time and a lot of frustration.*

*By Paul Eves*

**Y**ou are busy typing in your mega adventure game in Basic. You have been typing for over an hour and decide that at the end of the next line, you will save out your work. Suddenly, a quick power surge resets your 64 and you are left with nothing. (Unless of course you happen to have an OLD program out somewhere in memory - and how many of us bother to do that.)

That's just one of the hazards of Basic programming. Hopefully, this little program will come to your rescue.

Before you start typing your Basic program in, load up my AUTOSAVE program first. Type NEW then activate with SYND480. Now you don't have to worry about continually stopping to save out your work. Every five minutes your work will be saved out automatically, under the name of PROGRAM. Once the program has been saved control is returned back to you, as if nothing had happened. Just prior to the SAVE, you will hear a warning tone, this is so that you can stop typing whenever you're typing and wait for the SAVE. So how does the program work?

As you know, over sixtenth of a

second the CPU stops whenever it's doing and scans the keyboard and STOP key. Luckily for us, the vector that points to the interrupt routine lies in RAM. This means, of course, that we can change the vector address to our own address. Therefore, every sixtenth of a second the machine will do what we want it to do before executing its own interrupt routine.

And how do we do that?

The first thing we must do is disable the normal interrupts so that we can change the vector address. If we neglected to do this, the machine would cause an interrupt within an interrupt and just lock up. After changing the vector to point our own routine, we then re-enable the interrupts. The machine will now stop over sixtenth of a second, perform our unsaved interrupt, then continue with the normal interrupt.

So, what is our new routine? Firstly, we count down within a loop for five minutes. (I could quite easily have used the system clock under interrupt for this, but this way is shorter and neater.) If it's less than five minutes then the routine breaks out to

the normal keyboard scan interrupt routine at SEAN.

Once the countdown has reached the five minute mark the routine jumps to the warning tone routine. Here our friend SID performs three short beeps before jumping to the save routine. The screen is then cleared and the KERNAL routines SETLFS, SETNAM and SAVE are called one by one. To make the program flow easier to follow, I have incorporated a name save for both TAPE and DISK. (Obviously, tapes don't need a name in reality). After the save, the interrupts are not back to our routine once again and away the program goes.

Naturally the program could be expanded to incorporate a number of things. For example, you could have a LIST or a LOAD command put on to the P keys as well as the forced save. Obviously the more things that your interrupt has to perform, the slower the program becomes. (And it's not really good practice to rely too heavily on interrupts.)

I must say that I've found this program very helpful indeed. I just hope you'll get as much use out of it as I have.

TE

## PROGRAM: AUTOSAVE

Please read 'LISTINGS'  
before entering program.

```

CE 10 I=51480:D=0
FE 10 READ A:IF A=254 THENI5
FE 10 FORI 1,A:1-I+1:D=D+A:GOTO
20
E1 15 IFD<>57800THENPRINT"DATA
ERROR!":END
E3 40 SYS32480
C9 32480 DATA 162,0,160,11,142,
32,208,140
92 32488 DATA 33,208,232,142,13
4,2,202,189
7C 32496 DATA 3,206,32,210,253,
232,324,253
E2 32504 DATA 208,243,162,0,189
4,207,32
11 32512 DATA 210,253,232,224,3
8,208,243,162
7C 32520 DATA 0,189,42,207,32,2
10,253,232
F3 32528 DATA 224,24,208,243,32
,228,253,201
3C 32536 DATA 84,240,7,301,48,2
40,3,78
86 32544 DATA 32,200,133,254,16
9,13,32,210
5C 32552 DATA 259,169,71,133,25
1,133,253,120
D1 32560 DATA 169,94,160,205,14
1,20,3,140
5B 32568 DATA 21,3,88,78,116,16
4,165,197
19 32576 DATA 301,4,240,11,198,
251,308,4
28 32584 DATA 198,252,240,3,76,
49,234,120
69 32592 DATA 169,49,141,20,3,1
69,234,141
A2 32600 DATA 21,3,88,32,240,20
5,169,0
CD 32608 DATA 162,24,157,0,212,
202,16,250
61 32616 DATA 169,3,141,4,206,1
69,13,141
87 32624 DATA 24,212,169,17,141
5,212,169
8E 32632 DATA 248,141,6,212,169
,30,141,0
3D 32640 DATA 212,141,1,212,169
,17,141,4
C2 32648 DATA 212,162,253,140,1
05,136,208,253
49 32656 DATA 202,208,250,149,1
4,141,4,212
F3 32664 DATA 206,4,206,208,213
,169,3,141
5C 32672 DATA 4,204,169,147,32,
210,253,165
33 32680 DATA 254,201,84,240,3,
162,8,76
E8 32688 DATA 212,205,162,1,32,
184,253,169
5D 32696 DATA 9,142,251,160,205
,33,189,253
7B 32704 DATA 32,89,223,142,233
,160,253,202
F5 32712 DATA 208,253,136,208,2
50,78,73,203
A6 32720 DATA 162,253,160,253,2
01,208,253,136
35 32728 DATA 208,250,96,64,58,
80,82,79
C3 32736 DATA 71,82,65,77,0,147
,13,32
7F 32744 DATA 32,65,83,84,79,32
,83,65
47 32752 DATA 86,69,32,80,82,79
,71,82
83 32760 DATA 65,77,32,45,32,66
,89,32
41 32768 DATA 80,65,85,76,32,65
,46,32
6E 32776 DATA 69,84,69,83,13,17
,32,65
9C 32784 DATA 85,84,79,77,65,84
,73,67
7D 32792 DATA 65,76,76,89,32,83
,65,84
7C 32800 DATA 69,83,32,79,83,84
,32,66
39 32808 DATA 43,83,73,47,32,80
,87,79
7C 32816 DATA 71,82,45,77,83,13
,69,84
93 32824 DATA 49,82,49,32,33,32
,77,73
D0 32832 DATA 78,85,84,69,83,46
,91,83
E6 32840 DATA 78,48,49,82,32,84
,72,69
FC 32848 DATA 32,78,45,77,69,72
,80,82
F8 32856 DATA 79,71,82,65,77,93
,32,65
6D 32864 DATA 32,87,65,83,78,73
,78,71
BE 32872 DATA 32,84,79,78,69,32

```

	87,73	38	52968 DATA 77,69,78,67,69,83
8D	52880 DATA 76,76,32,83,79,83		46,13
	78,68	86	52976 DATA 91,78,69,87,93,32
C9	52888 DATA 32,80,82,73,79,82		66,69
	32,84	3D	52984 DATA 70,79,82,69,32,83
1E	52896 DATA 79,32,84,73,69,13		84,65
	83,65	C3	52992 DATA 82,84,32,13,80,82
84	52904 DATA 86,69,32,45,32,84		69,83
	73,73	8A	53000 DATA 83,73,78,71,32,70
8D	52912 DATA 83,32,87,73,76,76		49,32
	32,69	63	53008 DATA 63,78,89,84,73,77
3B	52920 DATA 78,63,66,76,69,32		69,32
	89,79	D7	53016 DATA 87,73,78,74,32,70
C9	52928 DATA 45,32,84,79,32,83		79,82
	84,79	8F	53024 DATA 67,69,32,63,32,83
1B	52936 DATA 80,32,89,79,85,82		65,86
	84,89	07	53032 DATA 69,13,63,83,83,73
11	52944 DATA 80,73,78,71,32,66		71,78
	66,70	F7	53040 DATA 32,68,69,86,73,67
4A	52952 DATA 79,82,69,32,84,72		49,32
	69,32	33	53048 DATA 40,84,32,79,82,32
66	52960 DATA 83,43,86,69,32,67		68,41
	78,77	D6	53056 DATA 32,33,32,296

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These findings have important implications for the design of training programs. First, the results suggest that training should be tailored to the specific needs of the target audience. For example, if the target audience is primarily composed of individuals with low levels of motivation, then training should focus on enhancing motivation. Second, the results suggest that training should be tailored to the specific needs of the target audience. For example, if the target audience is primarily composed of individuals with low levels of motivation, then training should focus on enhancing motivation. Third, the results suggest that training should be tailored to the specific needs of the target audience. For example, if the target audience is primarily composed of individuals with low levels of motivation, then training should focus on enhancing motivation.

[illegible][illegible][illegible]

The 1998 program results at 100,000 completed and the 1999 results at 200,000 completed, 100,000 completed can be used by a student for further enhancement of completed Day 100 graduation certificate.

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**Abstract**

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**Western Sussex CM8 2 8L England**  
**Telephone: 0378 - 51 54 71**

# Datamaker

*Turn your machine code into Data with these two programs from M. Colley and K. Olson.*

**U**nless you have access to an assembler entering machine code data is a real problem. Since machine code is simply a series of numbers, entering them into your computer leads to all sorts of errors, resulting in your program's total inability to function.

Your Commodore uses Basic loaders to help people to enter machine code programs from the magazines. These Basic loaders hold the numbers that make up the machine code program in a line of data, the last number being a checksum. The Loader program when RUN, reads the DATA into memory, adding each number together, then the total of each line is compared with its checksum, if they are not the same then you have done something wrong.

In the March 1986 issue of Your Commodore we printed a Basic program for the 64 (Datamaker) that would read a machine code file from disk and generate a machine code program. This worked fine except for a couple of small problems. Firstly the program was very slow. Secondly, you had to have a disk drive to use it.

With this article we are printing two new machine code to data statement conversion programs. One of them is for the C64 but this time the program is written in machine code and will now take machine code from memory as well as from disk. The second program is for the C128, this program isn't quite as fast as the one for the C64 but it does have the advantage that it generates its own SAVE routine at the end of the data so that, when RUN, the program will SAVE the machine code on to disk.

## C64 Data Maker

As I mentioned earlier, this version of the data maker program is better than the old one. A further facility that has been added is an extra check in the

loader program. If, in the old version of the program, you entered a number from a line of DATA, the computer would read the checksum and try to POKE it into memory. Since the checksum is usually greater than 255 this resulted in an illegal quantity error in the line that held the POKE statement.

This new version of the program has a check that stops the program if the number to be POKE'd into memory is greater than 255, giving the line from which the DATA was read, not the line of the POKE statement. As you can see this makes finding typing errors even easier.

The C64 Datamaker is presented here in the form of a Basic loader. In fact the program was used to make this loader.

As already mentioned this is a machine code file that should be LOADED and RUN at memory location 49132 (BC08 hex).

To start the program you enter the following commands:

```
NEW
SYS 49132
```

As soon as you press RETURN the screen will clear and a prompt "INSERT READER PROGRAM Y/N" will appear. If you is selected the single loader program shown in Figure 1 will be entered into memory.

Data maker will work out the last line of any program already in

memory, add 10 to it and start its own numbering from there. This allows DATA statements to be added on to an existing program.

Once the reader has been entered or if no (N) was selected a second prompt "SELECT DISK OR MEMORY" will be displayed.

If MEMORY is selected further prompts for start and end addresses will be displayed. These numbers may be entered in decimal or in hex by prefixing the number with a dollar sign.

If DISK is selected a filename will be requested.

Once the end has been reached Data Maker will insert the number of blocks, line number and memory start address into the reader part (only if the reader was entered of course.) It will then return to Basic with the READY prompt.

## Data Maker 128

Data Maker 128 is a utility program for the C128 computer with a disk drive. The program will take any file, the SOURCE program, from the disk, convert it into DATA statements and write it back to the disk under a supplied filename, the TARGET program. You will also be requested to supply a START LINE NUMBER and an increment value for the DATA STATEMENTS. Twenty individual

FIGURE 1

```
10 BL=0: A=1: L=0: Y=1: SP=1: Z
20 FOR L=0 TO BL: CX=0: GOTO 40
30 READ A: IF A=255 THEN PRINT L: L=L+1
40 L=L+1: STOP
40 CX=CX+A: POKE BA+L, A: A=NEXT
50 READ A: IF A=255 THEN PRINT L: L=L+1
60 NEXT L: GOTO 20
```







[illegible]

4, 181, 31, 200, 2313	3, 64, 76, 38, 67, 66, 179, 68, 36, 1	0, 0, 0, 0, 0, 0, 0, 0
26 1740 6476 151, 252, 0, 189, 176, 1	28, 32, 1330	1620 6476 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
191, 248, 7, 32, 190, 191, 636, 76, 1	1360 6476 48, 136, 48, 32, 164, 3	0, 31, 37, 37, 32, 32, 63, 66, 629
5, 184, 169, 1345	2, 67, 12, 0, 191, 31, 69, 16, 135, 3	1640 6476 40, 82, 84, 31, 40, 48
67 1600 6476 0, 12, 181, 192, 32, 66	3, 65, 1330	69, 12, 0, 13, 13, 32, 32, 32, 32, 32
191, 162, 0, 169, 158, 699, 160, 3	1620 6476 173, 60, 32, 15, 161, 1	344
3, 320, 1619	28, 16, 76, 61, 71, 66, 43, 62, 31, 6	76 1676 6476 67, 76, 68, 32, 61, 66
26 1740 6476 160, 212, 76, 31, 196, 1	6, 75, 1330	66, 31, 6, 6, 0, 0, 0, 0, 0, 247, 627
169, 6, 32, 269, 191, 13, 66, 151, 0	67 1700 6476 31, 16, 69, 62, 71, 69	1616 6476 5, 6, 17, 67, 17, 12, 32
67, 0, 66, 1619	26, 75, 76, 76, 160, 68, 76, 13, 66	11, 76, 76, 67, 69, 66, 66, 32, 61, 1
62 1700 6476 169, 199, 160, 7, 31, 0	68, 1697	16 1688 6476 69, 67, 66, 69, 62, 31,
61, 167, 235, 76, 67, 179, 167, 6, 3	1700 6476 61, 36, 166, 0, 67, 66	66, 62, 74, 71, 62, 62, 73, 32, 66, 4
2, 200, 161, 2116	1700 6476 170, 65, 36, 131, 12, 6	1, 1697
66 1700 6476 31, 66, 193, 160, 0, 39	3, 65, 1330	1645 6476 76, 0, 0, 0, 0, 0, 0, 0, 0
9, 236, 169, 202, 7, 32, 164, 160, 3	61 1648 6476 160, 76, 171, 69, 36, 1	0, 0, 0, 0, 0, 0, 0, 0, 16
31, 36, 66, 1330	16, 66, 61, 65, 36, 130, 31, 66, 0, 6	1640 6476 6, 6, 1, 0, 0, 0, 347, 3
23 1616 6476 169, 169, 6, 32, 302, 1	6, 11, 1330	17 17 17 17 31, 11, 32, 63, 616
67, 31, 66, 167, 166, 0, 169, 21, 0	73 1616 1616 176, 31, 17, 32, 32, 31	1680 6476 6, 6, 75, 67, 61, 62
0, 360, 7, 1617	66, 76, 36, 176, 31, 13, 32, 32, 31	66, 71, 69, 73, 32, 79, 62, 12, 71, 6
62 1700 6476 12, 303, 167, 310, 76	68, 666	6, 1666
66, 169, 169, 0, 32, 200, 167, 12, 6	62 1660 6476 65, 65, 134, 32, 32, 32	1680 6476 31, 76, 62, 69, 0, 167
6, 167, 32, 676	13, 32, 0, 0, 135, 12, 65, 36, 129, 32	17 17 17 17 32, 32, 71, 65, 65, 66, 3
69 1680 6476 169, 766, 162, 0, 669	6, 1617	1, 1666
67, 176, 248, 7, 32, 269, 191, 212, 1	31 1700 6476 177, 176, 67, 66, 32, 0	1668 6476 73, 63, 66, 69, 32, 76
76 1670 6476 169, 0, 32, 302, 167, 3	67, 169, 36, 69, 67, 65, 75, 63, 31, 2	73, 76, 69, 32, 16, 69, 71, 69, 0, 16
66, 0, 17, 167, 169, 0, 31, 200	71, 36, 1616	7, 1666
1799, 165, 1666	60 1648 6476 31, 36, 13, 76, 16, 36	32 1610 6476 17, 17, 17, 13, 16, 76
1699 6476 211, 131, 63, 163, 232	69, 76, 134, 176, 60, 163, 69, 66	73, 76, 69, 32, 16, 66, 71, 69, 11, 6
171, 66, 32, 31, 167, 66, 6, 6, 1	67 1648 6476 68, 666, 0, 160, 31, 76	676
75, 31, 2530	66, 616, 0, 0, 0, 0, 0, 0, 0, 0, 0	76 1620 6476 0, 0, 0, 0, 0, 0, 0, 0, 0
60 1700 6476 76, 176, 68, 32, 166, 3	62 1600 6476 0, 0, 0, 0, 0, 0, 0, 0, 0	64, 63, 36, 130, 16, 66, 0, 167

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You start the game positioned at the top left of the complex, your way out to the next level being at the bottom right. However, to get there you must find your way around the rooms using the elevators to get from floor to floor. However life isn't that simple.

Firstly the other robots are out to get you. Fortunately you can shoot

back at them destroying both them and their missiles that they have a tendency to fire at you.

Secondly, quite a number of doors within the complex are locked. Before you can go through them you must collect the corresponding coloured key to unlock it. Oh! by the way you can only carry one key at a time.

Once you have managed to leave one level you will find yourself in the next area of the complex. The only difference between this one and the last is the fact that the robots don't give you quite as much time before they come after you.

## Controls

Playing the game is quite simple. All

control is via a joystick in port two. Each direction has the following operation.

- LEFT = move your droid left
- RIGHT = move your droid right
- UP = move up on a lift
- DOWN = move down on a lift or snap the key you are carrying when stood over one of a different colour.
- FIRE = shoot in the direction you are facing.

To load the game simply position the tape before the game and press SHIFT and RUN/STOP.

If you are using a C128 don't forget to turn the computer into C64 mode before you run it.

# Midi Music and You

*Ian Waugh brings you MIDI without tears and explains how Commodore owners are the luckiest people in the musical world.*

**U**nless you automatically turn the page at the sight of an acronym or unless you've been holidaying on Mars for the last three years, you must have heard of MIDI. If you have bravely tackled articles about MIDI and are still feeling left out in the cold you may be forgiven for thinking that a compendium is about to keep MIDI and its secrets out of the hands of the computer-owning public.

The fact is, there has really been no down-to-earth source of information about MIDI and rather than spend (or waste!) a couple of pages explaining what it is, most magazines have plunged straight in with MIDI equipment reviews leaving many readers stranded at the start. Let's try to put that right. Explanations first; the reviews will follow in Part Two.

## What is MIDI?

MIDI is an acronym for Musical Instrument Digital Interface. It was designed and developed by major musical instrument manufacturers such as Sequential, Roland and Yamaha to overcome the problems of linking together instruments produced by different companies. Each manufacturer has its own individual instrument design and prior to MIDI the chances of mix-and-match without expensive interface equipment were remote. MIDI laid down rules by which musical information could be standardized in digital form and transmitted and received through DIN sockets. Instruments have at least two such sockets: MIDI IN and MIDI OUT. Many also have a MIDI THRU socket which passes on information received via MIDI IN. This enables you to daisy-chain together several pieces of equipment.

In its simplest form MIDI works like this: if you connect the MIDI OUT of keyboard one to the MIDI IN of keyboard two, the first keyboard will transmit musical data down the cable and you will be able to 'play' the second keyboard from the first.

The first keyboard is known as the Master and you could connect other keyboards to the system by using MIDI THRU sockets. MIDI really comes into its own, though, when under computer control. As the signals are digital, what better way to control them than with a computer.

## Signals

The nature of MIDI signals sometimes causes confusion. It is important to realize that they are not audio signals but digital signals, the zeros and ones of computer language. They control the pitch and alter the instrument's performance controls such as pitch-bend, modulation (for vibrato), sustain, volume, velocity, sensitivity (the harder you hit a key, the louder the note) after touch (pressing a key down further after playing it to produce woe or delayed vibrato, etc.) and patch changes.

Not all MIDI instruments have all these facilities and it's important to realize that you can't produce after touch for example on a keyboard which does not have it built-in. Many drum machines and effects units such as echo and reverb now have MIDI so you can put these under computer control, too.

It wouldn't be terribly useful if you could only control one instrument at a time - a sequencer could do that - so the MIDI specification permits up to 16 different messages to be sent at once. Each message, carrying its own

pitch and modulation information etc., is sent on a different channel, and the receiving instruments can be 'tuned in' to the channel you want them to respond to. Actually, MIDI data is transmitted serially so although information on all channels is not technically sent together it's fast enough to seem like it.

When information is transmitted, a code is sent to identify which channel the message is meant for. Most instruments allow you to set the channel they will broadcast and receive on and they will ignore data intended for other channels. Under computer control you will normally allocate a different channel to each musical part e.g. channel one for the bass, channel two for strings, channel three for lead synth, etc. The software will then send the parts to the right instruments.

## In Use

It is not essential to know how MIDI works in order to use it and although the principles are quite simple the implementation can appear quite daunting. For example, it is necessary to literally spell out every single operation you want an instrument to perform - much as you must spell out everything to a computer. There's a MIDI code for turning a note on and one for turning it off. Some operations such as after touch require large amounts of information which can quickly use up the computer's memory. Some software gives you the option of ignoring such memory-hungry features.

Normally the software will take care of all these functions, for you but some programs, especially editing packages, let you get right down to

such mitty grins. It can be useful and it certainly has its place but many MIDI users make music quite happily without delving too deep.

## The Lingo

Like other aspects of music and computers, MIDI has its own jargon. It is important to distinguish between channels, as previously referred to, and tracks. Tracks works in a similar way to the tracks on a multi-track tape recorder - only you can do more with a MIDI track in a computer than you can with an audio track on tape. Software packages will generally allow you to record on four, six, eight or 16 tracks and each track can be assigned to play on a different channel.

Like audio tracks, MIDI tracks can be merged (or bounced in the case of tape) but unlike audio tracks, they can also be transposed with no alteration in tempo and the tempo can be changed with no alteration in pitch. You can do lots of other things with MIDI data, too, even play a piece backwards, and each software package often has its own specialities.

## MIDI modes

There's one more aspect of MIDI control which causes no end of confusion and that is MIDI modes. These affect the way an instrument responds to the channel selection. The two main modes are the ones you are most likely to use. The first is OMNI OFF/POLY mode. In this mode the instrument will receive polyphonic music (i.e. many notes at once) only on its set MIDI channel (one to 16). If OMNI was ON the instrument would pick up data on all channels which could sound like chaos.

The other main mode is OMNI OFF/MONO. This is usually only of use with multi-timbral instruments. Not many of us have 16 instruments to plug into our computer but some keyboards are able to sound more than one voice at once - under computer control - and these are known as multi-timbral. The most well-known and among the cheapest are Casio's CZ range which includes the CZ101 (around £400) and CZ1000 (around £400). Sequential also produces multi-timbral instruments as do JVC and with luck more will continue to appear.

Mono means only one note will sound at a time and is MONO mode.

The instrument will play a number of different lines, each with a different voice. Each voice will be receiving on a different MIDI channel and will play, of course, only one note at a time. Multi-timbral instruments were made for MIDI and are a fairly cheap way to get started. Typically, as in the channel example, you could program one voice to play a bass line, another to play a guitar lead line, the third could play a string line and the fourth could play arpeggios on a flute.

## Plugging In

When we talk of instruments being plugged into the computer, they are not plugged in directly. The connection is made via a MIDI interface, one end of which plugs into the computer, normally the cartridge port on the C64. Depending upon its complexity and sophistication, the interface will contain a number of sockets. The main ones, which all interfaces have, are MIDI IN and MIDI OUT which connect to the MIDI IN and MIDI OUT sockets on an instrument. Many interfaces also have a MIDI THRU which performs the same function as the MIDI THRU on an instrument as described earlier.

Some interfaces have a Sync to Tape socket which allows an audio pulse from a multi-track tape recorder to control the speed of the music so several overdubs can be made on to tape in time with each other. A Clock line enables an external source such as a drum machine to control the speed of the music. These and other controls can often be bought as separate units if your particular interface does not possess them as standard.

## Software

There are two main types of MIDI software. The first and most common type allows you to record and play back music. The second kind helps you program the voices on digital synths. Most modern digital synthesizers are not as easy to program as analogue machines. Their parameters are usually displayed as numbers and often you can only alter one parameter at a time. The problem is really only fully appreciated when you start creating sounds yourself.

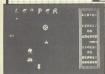
Voice Programs give an on screen graphic representation of parameters and often let you alter more than one control at a time. You can usually save the voice to disk; a good way of building up a sound library. You can save a fortune on a plug in RAM packs, often enough to pay for the software. The Yamaha DX range and Casio's CZ synths have benefited most from such packages which are really worth considering if you have one of these synths.

The music-making packages fall into two groups: real-time and step-time. Real time is when you enter notes by playing the keyboard - in real-time, obviously. Step-time is when you enter notes one at a time either from the synth keyboard or from the computer.

Real time is faster but you get everything you play, warts and all. However, you don't need to be a Paderewski or a Rick Wakeman to use real-time software. Thanks to MIDI you can record a piece slowly and speed it up to its correct tempo. You can even play 'impossible' pieces this way and impress your friends no end. If you can't quite get your left hand and right hand to work together, you can record them separately on different tracks and merge them when they are non-competitive. Using similar methods you can record a piece requiring four or five or ten hands to play.

Step-time is obviously more accurate but you need a little patience to put in all the notes. Different software packages take different approaches to step-time input. If you are a musician, you may prefer to enter the notes in traditional notation on a staff. If you are entering music from a written score you may find this advantageous, too.

Other programs adopt a more computer-orientated approach and display note information as a note plus octave number with a value for its duration and a value for its 'on' time, i.e. how long the 'key' is held down. You will also need to enter data such as pitch changes and modulation information, something which real-time input normally does as you play. This can take a little getting used to and the non-musician probably has an advantage over the musician here. ■



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# Welcome to the Machine

*ROM routines revealed. Read on to find out how to input data into your machine code*

*By Allen Webb*

**I**n this article, I want to consider how data can be input into your code by means of the ROM routines.

The initial method of inputting data is to POKE values into the relevant locations used by the code. This method is good enough and may be mandatory if you're using a Basic driver program and you want to use a compiler. Those of you with more refined taste will want something better.

One of the most important routines in the Basic ROM starts at \$A19E. This evaluates input expressions and checks the syntax. There are a large number of entry points to this routine which can be used for our benefit.

## Getting into M/C

There are two commands for the accessing of machine code from Basic. First we have the USR command. It's full syntax is:

Variable = USR(expression)

The expression within the brackets is evaluated and stored in FAC/1 (floating-point accumulator no 1). This value is then used in your code. The entry point of your code must first be stored in the vector in locations \$0400 to \$0412. On leaving the routine, the value in FAC/1 is transferred to the variable in the calling instruction. Since you can only pass one parameter, this instruction is of limited value.

The more frequently used command is SYS. This simply calls the machine code starting at the specified

address. Since SYS doesn't support parameters, we must use some coding to add them. The most usual syntax adopted is of the form:

SYS address, parameter 1, parameter 2...etc

After your code is entered, the Basic test pointer is pointing at the character after the SYS. We can check this character using four routines:

SAEFT - check that character is a right bracket  
SALEFA - check that character is a left bracket  
SAIFD - check that character is a comma  
SAEFF - check that character is that held in the accumulator

These routines give a SYNTAX ERROR if the character is not that sought. If the character is correct, the

### LISTING 2

```

40 CHKCOMMA = $A1FD
50 CHKLFAR = $A1FA
60 CHKRFAR = $A1F7
70 EVALTERM = $A08A
80 FLPTPOINT = $B7F7
85 CHKCHAR = $AEFF
90 PARAM1 = $AA
95 PARAM2 = $FB
100 JSR CHKCOMMA : IS 1ST COMMA THERE ?
110 JSR CHKLFAR : OPEN BRACKET ?
120 JSR EVALTERM : YES = GET VALUE
130 JSR FLPTPOINT
140 LDA $14 : AND SAVE IT IN
150 STA PARAM1 : RESULT 1
160 LDA $15
170 STA PARAM1+1
180 JSR CHKRFAR : CLOSING BRACKET ?
190 JSR CHKCOMMA : NEXT COMMA ?
200 JSR EVALTERM : YES = GET VALUE
205 JSR FLPTPOINT
210 LDA $14 : SAVE IT IN
220 STA PARAM2 : RESULT2
230 LDA $15
240 STA PARAM2+1
250 RTS

```

next pointer simply moves on to the next character.

## Parameters

Having sorted out the separators, we want to evaluate the parameters. This is readily achieved by calling `SADBA`. This evaluates the expression which is being pointed at by the test pointer and stores the result in `PAC/1`.

Consider the Listing 1:

```
10 JSR $A0FD
20 JSR $ADBA
```

This will extract a single parameter after checking for a comma and leave the result in `PAC/1`. In other words, it checks the syntax.

`SYS address, parameter`

This system is in fact quite tolerant. Spaces are ignored allowing freedom of syntax. The parameter can be any valid expression as a numeric value.

Listing 2 is more complex. It checks for a rather bizarre syntax i.e.

```
SYS address,(parameter 1)parameter 2
```

You will note that I've used the routine at `$B07F` to convert the parameter in `PAC/1` to integers.

You may, alternatively, wish to transfer non-numeric data in strings. Again, there are routines for this purpose. First, we call `$ADBE` to evaluate the expression. This time, the routine will detect that we have a string and will exit with the length of the string in the accumulator and the start address of the string in `$04` and `$05`. A call to `$BBA6` erasing previous copy of the string by moving the string pointers. On leaving this routine, the start address of the string is in `$23/$24`. Listing 3 handles the syntax:

`SYS address, string`

## LISTING 3

```
20 GETSTR JSR $A0FD : CHECK COMMA
30 JSR $AB9E : EVAL EXPRESSION
40 JSR $BBA6 : SAVE ADDRESS IN $23/$24
50 STA STRINGLEN : SAVE STRING LENGTH
60 LDA $23 : START ADDRESS OF
70 STA STRINGADD : STRING - LSB
80 LDA $24 : START ADDRESS OF
90 STA STRINGADD+1 : STRING - MSB
95 RTS
```

This routine will accept text or strings, e.g.

```
SYS address,$A
SYS address,"test"
```

The data given by Listing 3 can be easily manipulated. Listing 4 takes this data and moves it to a buffer.

## LISTING 4

```
10 LDY #0
20 LOOP LDA (STRINGADD),Y
30 STA BUFFER,Y
40 INY
50 CPY STRINGLEN
60 BNE LOOP
```

So what happens if you want to input numeric information during the operation of the program? Well we can use some of the techniques described earlier in this series. Consider listing 5.

## LISTING 5

```
40 BUFFER = $0300
40 CHKSTR = $ADBA
70 LDY #0 : INPUT ROUTINE
80 LOOP JSR $B0FC : IF RETURN EXIT
90 CMP #11 :
100 BEQ QUIT : PUT INTO BASIC
110 STA BUFFER,Y : INPUT BUFFER
120 INY :
130 JMP LOOP :
140 OUT LDA #0 : TERMINATE INPUT STRING
150 STA BUFFER,Y : WITH A ZERO
160 LDA #BUFFER : TELL CHARGST ROUTINE
170 STA $007A : WHERE TO FIND
180 LDA #BUFFER : OUR INPUT
190 STA $007B :
200 JSR $0079 : GET CURRENT CHARACTER
210 JSR CHKSTR : IS THE INPUT NUMERIC ?
220 JSR $B0D0 : JUST TO SHOW THAT THE
230 JSR $AB1E : ROUTINE WORKS!
240 RTS
```

The block of lines from 70 to 130 perform the input step and simply get each character and put it into a buffer. You may remember that we've used this before. Line 90 detects the RETURN key and terminates entry when it's pressed. I haven't put a limit on the acceptable length of the input, but it's easily done. The input is terminated with a zero byte.

The buffer used is special in that it's the buffer used by Basic to handle text. Having input our text, we must tell Basic about it and where to find it. First, we put the start address (`$0300`) of the text into the test pointer used by the `CHARGST` routine. This is done by lines 140 to 190. We then call the `CHARGST` routine in line 200. This puts the first character in your text into the accumulator. We can now call the routine at `$ADBA` to evaluate the text pointed to by the test pointer. This converts the text to a floating point number in `PAC/1`. The last two instructions print out the `PAC/1` to show that the routine works.

I've just mentioned a beast called the `CHARGST` routine, let us consider what it does. When processing the Basic has to keep track of the text. This is achieved by a short but useful routine which sits in zero page RAM. Listing 6 shows this routine.

When the 64 is powered up, this routine is copied down from ROM. The reason is because the test pointer, which is held in addresses `$79` and `$7A` is incremented by lines 10 to 30 of the

## LISTING 6

```

10 $0073 CHARGET INC $7A
20 $0075 BNE CHARGET
30 $0077 INC $7B
40 $0079 CHARGET LDA $7FFF
50 $007C CMP #83A
60 $007E BCS OUT
70 $0080 CMP #820
80 $0082 BEQ CHARGET
90 $0084 SEC
100 $0085 SBC #830
110 $0087 SEC
120 $0088 SBC #800
130 $008A OUT RTS

```

routine. This is why the address in line 40 is not specified. Lines 70 and 80 check for spaces and ignore them. The rest of the routine checks to see if the character is numeric. If the character is numeric, the routine exits with the carry cleared, else it is set. The accumulator holds the character.

There are two main entry points:

- 1) CHARGET - this extracts the next character in the text.
- 2) CHARGET - this gets the character currently pointed to by the test pointer.

By use of this routine, it is possible to examine text and thereby use more complex commands. Consider the routine. When an command is handled, the text is scanned. If the first

part of the CHARGET routine were altered so that the routine jumped to your own routine, it would be possible to detect non-standard character sequences and perform actions accordingly. Listing 7 gives an illustrative example.

Lines 40 to 100 insert three bytes into the start of the CHARGET routine. These bytes correspond to JMP WEDGE. This means that every time that CHARGET is called, it immediately jumps to WEDGE. The first thing that WEDGE does is to increment TXTPTR. This is necessary since the inserted JMP has prevented CHARGET from doing this. Line 190 gets the next character and we check to see if it was @. If not, line 199 squares control to BASIC via CHARGET. If @ was detected, line 200 onwards change the border colour and return control to BASIC. Lines 228 to 240 increment TXTPTR again. This takes the pointer beyond @ so that Basic doesn't notice it and give a syntax error. To use the routine you must remain until the machine is reset. Because we are wedging in a JMP instruction, this sort of routine is called a wedge.

This routine will work both in direct mode (try typing: followed by RETURN) and in a program. You can use any command name you like provided you write the code to check it. The only prime need is to use a first character which is not used by BASIC. Obvious examples are @, !, >, < etc. The characters after it can be what you like. You could, for example, use @PRINT, @LOAD, > SELF-DESTRUCT etc.

There are two shortcomings of Charget wedges:

- 1) They are notokenised as commands will use more memory than

usual. Most software using this system have short commands as a result.

- 2) Since your code will be called each time CHARGET is called, the execution speed of Basic will be slower.

Notwithstanding these faults, the wedge is an easily installed device which is very popular.

I realise that I only have time for a brief description of the functioning of ROM routines. If you want to learn more, you must read some of the better books around. The two I mentioned last time (by Nick Hampshire) are better than most. The news letters issued by SCPU8 (Independent Commodore Products Users Group) are also a useful source of information.

Next month I will tackle the floating point routines.

### Homework

Last month I set you quite a messy task. In fact, although the task seems quite large, it's quite simple if you split it into sections. Consider this answer 1.

In order to handle the text, a buffer starting at \$B0 is used. Lines 1090 to 1130 fill the first ten characters with spaces. Lines 1150 to 1270 prompt for an input and put the input into the buffer. Since we're interested in the first four characters of the input and the input could be less than this length, lines 1280 to 1330 pad it out with spaces until four characters are there. Lines 1340 to 1390 terminate the input with a zero byte. This allows us to use the routine at \$ABE to print the word later. Line 1400 to 1560 search the word table for the input and according to the result, a message is output. I'll leave you to sort out the search algorithm. The multiplication in line 1280 and 1290 bump the test pointer by first characters for each entry in the word table.

I'm setting two problems this month but you need not answer both unless you're really keen.

I want to pursue this idea for the first homework question this month. Imagine that you have a piece of text in a buffer starting at location TEXTSTART and terminating with a zero. The length of this text (including the zero) is held in location TEXTLEN.

Write a routine which will scan the text and locate words according to these rules:

- 1) Words are separated by spaces, all other characters are assumed to be part of words.
- 2) If only one word is found, it is a verb, eg TAKE, EAT

## LISTING 7

```

10 CHARGET = $0073
20 CHARGET = $0075
30 TXTPTR = $7A
40 INITIALISE LDA #84C
50 STA CHARGET
60 LDA #4WEDGE
70 LDA #4WEDGE
80 STA CHARGET+1
90 LDA #4WEDGE
100 STA CHARGET+3
110 RTS
120 WEDGE INC TXTPTR
130 BNE LOOP
140 INC TXTPTR+1
150 LOOP JSR CHARGET
160 CMP #0
170 BEQ LOOP1
180 JMP CHARGET
190 LOOP1 INC $020
210 INC TXTPTR
230 BNE LOOP2
240 INC TXTPTR+1
250 LOOP2 JMP CHARGET

```

# Homework - answer 1

```

1000 % = 8000
1010 BUFFER = $B0
1020 COUNTER = $FFFE
1030 COUNTER = $FFFE
1040 PRINTMSG = TABLE
1050 PRINTMSG = SPACE
1060 COUNT = $99
1070 :
1080 :
1090 LBY #0 ; INITIALISE BUFFER
1100 LDA #1
1110 LOOP1 STA BUFFER,Y
1120 INC
1130 CPY #10
1140 BNE LOOP1
1150 LDA #143 ; PRINT PROMPT
1160 JBR CROUT
1170 LDA #". "
1180 JBR CROUT
1190 :
1200 :
1210 LBY #0 ; INPUT WORD
1220 LOOP1 JBR CROUT
1230 CPM #13
1240 BNE LOOP1
1250 STA BUFFER,Y
1260 INC
1270 JBR LOOP1
1280 LOOP1 CPY #4 ; IF WORD LESS THAN
1290 BCS LOOP1 ; FOUR CHAR. THEN PAD
1300 LDA #0 ; IT WITH SPACES
1310 STA BUFFER,Y
1320 INC
1330 JBR LOOP1
1340 LOOP1 LDA #0 ; TERMINATE BUFFER WITH
1350 STA BUFFER,Y ; ZERO
1360 LDA #11 ; CARRIAGE RETURN
1370 JBR CROUT
1380 :
1390 :
1400 LBY #0 ; INITIALISE WORD COUNT
1410 CPM COUNT
1420 LOOP1 LDA #0 ; SEARCH WORD TABLE
1430 LOOP1 LDA BUFFER,Y
1440 CPM TABLE,Y
1450 BNE MATCH ; DOESN'T MATCH
1460 INC ; IT MATCHES
1470 INC ; TRY NEXT CHARACTER
1480 CPM #4
1490 BNE LOOP1
1500 JBR FOUND ; FOUND IT!
1510 WORDCOUNT INC COUNT ; INCREMENT WORD COUNT
1520 LDA COUNT ; ANY MORE WORDS TO CHECKPOINT
1530 CPM TABLE ; NO
1540 BNE NOTFOUND
1550 BSL A ; INCF COUNTER BY 4 TIMES
1560 BSL A ; WORD NUMBER
1570 TRY
1580 JBR LOOP1 ; NEXT WORD
1590 NOTFOUND LDA #MESSAGE ; TELL WORLD ABOUT IT
1600 CPM #10
1610 JBR PRINTMSG
1620 LDA #BUFFER
1630 LBY #BUFFER
1640 JBR PRINTMSG
1650 RTS
1660 FOUND LDA #MESSAGE ; FRIENDLY MESSAGE
1670 LBY #MESSAGE
1680 JBR PRINTMSG
1690 LDA #BUFFER
1700 LBY #BUFFER
1710 JBR PRINTMSG
1720 LDA #MESSAGE
1730 LBY #MESSAGE
1740 JBR PRINTMSG
1750 LDA #0
1760 LDA COUNT
1770 INC
1780 JBR PRINTMSG
1790 LDA #MESSAGE
1800 LBY #MESSAGE
1810 JBR PRINTMSG
1820 RTS
1830 :
1840 TABLE BYTE "TAKELONGINGWTF BITTERILL"
1850 ASCII "TAKELONGINGWTF BITTERILL"
1860 TABLE BYTE 11
1870 MESSAGE ASCII "THE WORD "
1880 BYTE 0
1890 MESSAGE ASCII " IS NUMBER "
1900 BYTE 0
1910 MESSAGE ASCII " IN MY WORD LIST"
1920 BYTE 0
1930 MESSAGE ASCII "I DON'T RECOGNISE "
1940 BYTE 0

```

If two words are found, the first is a verb and the second a noun, e.g. TAKE WORD1, BAT NKAKE.

Extract the verb and move it to a buffer starting at VERB and put its length into VERBLEN.

Similarly move the noun to a buffer starting at NOUN and its length into NOUNLEN.

Consider this simple method of text compression. If you use just 32 characters, you only need five bits to save each character. This being the case, you can save three characters in

two bytes giving 50% saving in RAM.

Consider this example:

Character 1 — %00011111  
Character 2 — %00010101  
Character 3 — %0100011011

This compresses to:

Byte 1: %11111101 and Byte 2: %01110100

As you can see, character 1 now

occupies the top five bits of byte 1. Character two occupies the bottom three bits of byte 1 and the top two bits of byte 2. Character three occupies bits 1 to bit 5 inclusive of byte 2. Bit 6 to byte 2 is set to zero.

Your task is to:

- 1) Develop an algorithm which performs the compression.
- 2) Write a routine to do this job using as far as possible logical shift and rotate and boolean instructions such as OR and AND.



# Quick on the Draw

*Expressing yourself on your C64 is easy with the correct graphics program. Your Commodore takes a look at three new packages.*

*By Stuart Cooke*

No matter where you look, you are bound to see something graphic that was produced by a computer. Computer Graphics are now used in TV, films, advertising, etc. There have even been exhibitions where artists have shown their latest piece of computer art to the public.

Contrary to popular belief you don't need a fantastic, thousands of pounds, computer. In fact you can 'paint' some very interesting and colourful pictures on your humble home micro, whatever it may be.

An artist using standard paints, brushes and canvas must have the correct tools. There's no point in trying to paint a thin line with a brush that is more suitable for poking the fire. The computer artist must also have the correct tools of the trade. A graphics package that he feels comfortable with is a must. All of the options that he should even require should be present. It must also allow him to use the controller that he feels most happy with, such as a joystick or mouse.

Three new packages have appeared on the market over the last few months, each offering slightly different facilities to the artists and different levels of complexity. Below you will find a description of each of the packages and its facilities. Only you can decide what you will require from the package.

## The OCP Art Studio

This package is probably the most friendly and well presented package



that I have ever come across. All commands are accessed from a series of pull-down menus, rather like those that were made known by the Macintosh computer. For those who have never used pull-down menus, you use them like this: The input device is used to move your pointer around the screen. If you move it into the area of the menus at the top of the screen, and press the fire button (or whatever) then the menu that you are pointing at will appear on the screen. You can now move your pointer up and down this menu and choose the option that you require.

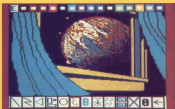
With the Art Studio you have a choice of four different input devices. You can use the keyboard, a joystick, a mouse or a Mouse Pad to move the

pointer around the screen. A nice touch is the fact that the program always displays the device that you are using at the top right of the screen. The reason for this is that you may sometimes have to revert to the keyboard for entering text, etc. This icon warns you from making any mistakes.

Probably the best way to discover the operation of the program is to deal with each of the menus as they appear across the screen.

## Print

The ability to get a hard copy is most important, after all there's no point just having your picture on the screen. This menu allows you to dump your picture to a printer. A separate



program allows you to set up the correct printer. Options include Commodore and Epson compatible printers. Five sizes of printers are available from 1"1 to 3"5. However certain printers can only print certain sizes.

Since your pictures will no doubt be in colour, the option of printing your pictures in grey scale is present. This simply replaces each of the 16 available colours with a shade of grey, this is equivalent to a 3"5 dump. Options are also available to print your picture sideways, at the left of the page, right hand edge or in the middle.

## File

This option simply lets you select whether you are using cassette or disk and then allows you to keep your latest masterpiece for future reference.

A facility is present for merging a picture that has been saved with one that is already in memory, though I must admit I've not found a use for this yet.

If you are using disk then a fair range of commands are available to you. It is possible to have up to four different drives connected to the computer, changing from one to the other is simply a matter of selecting DEVICE from the disk pull down menu and changing the number. Commands available allow you to RENAME files, DELETE files, FORMAT a disk, etc.

When using disk, selecting the correct file for use is extremely easy, simply select the LOAD option from the menu and the list of files available will appear in another window. Now

move the pointer to the picture that you require press the button and wait until it has loaded.

## Attributes

Obviously colour plays a great part in the actual look of your picture. This option allows you to select the ink (foreground) colour, paper (background) colour and the border colour. Once you have chosen an ink you can set it to transparent, this means that you cannot change it when anything is drawn over it. Options also exist to allow you to overwrite existing colours or simply inverse them with the new colour.

## Paint

Now we start to get to the fun part. This option allows you to select the

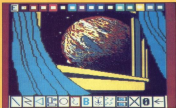
type of painting tool that you want to use. Options available are, Pen, Spray can and brush. There are 16 different pens available, each one of a different thickness or angle. Once you have selected the correct pen you can start to draw with it in the drawing area. Eight spray cans are available. Each one having a different density of spray dots, this is great for texturing areas of the screen.

Eight different brushes are available ranging from a dot to a smiling face. One of the brushes is totally blank. This allows you to colour in areas of the screen very easily once you have finished designing a picture in black and white.

If you require a special sort of brush then you can design one with the 'Brush edit' function. This simply allows you to design a brush in whatever shape you require it.

## Miscellaneous

This menu offers some extremely useful commands. For a start, since the menus occupy the top two lines of the screen you can only see 22 lines out of 24 at any one time. It is possible to move the screen up and down so that you can get the extra lines. The View Screen option gets around this by removing the menu from the top so that you can see the whole screen at once. Clear Screen speaks for itself and should be used with care since you don't want to lose hours of work. The change colour option is extremely powerful since it allows you to change one ink colour on the screen, or part of it, into another specified colour. Useful if you think the sea in your latest seascape is too dark.



## Undo

If like me you're a bit of a klutz when it comes to art then this option will be a life saver. Quite simply UNDO will remove the last operation from the screen. This also comes in handy when trying something out since you can always go back to the last picture if you don't like the effect.

## Windows

This is probably the most complex menu of all. A window is basically a box that is defined on the screen which can then be manipulated in some way. Options available allow you to clear a window. You can cut the window out of your picture and move it somewhere else. You can make copies of a window elsewhere on the screen. It is even possible to increase or decrease the size of a window, making that area of the picture larger or smaller. If this wasn't enough you can even rotate the window around as well as flip the section of picture that is in it.

## Fill

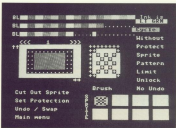
This option allows you to fill an colour in an area of your picture. The solid fill option allows you to fill an area with a solid colour. If you select textured fill you can fill the area with one of 32 different patterns. This could be used to give walls a brick texture, etc. You can also paint with a texture colouring areas of the screen as you pass the texture over it. Just in case you require a special texture and it doesn't appear to be available you can use the edit texture option to design your own.

## Magnify

When you draw your picture there will no doubt be areas of the screen that require special attention. The easiest way to make small changes to an area is to magnify it. This means that it is easier to see just what you are doing and where you are placing your colours. The magnify option allows you to blow up an area of the screen by x2, x4 and even x8. There is also an option for having a grid behind the picture so that you can have even greater control over where you place the colours.

## Text

Quite often it will be necessary to place some text within your picture. The text



option offers various facilities. You can print text from left to right or downwards. Your characters can be double or triple height. You can even have double or triple width. If you don't particularly like the font that the characters are in then the Font Editor allows you to design your own.

## Shapes

The final menu option allows you to choose from a variety of different shapes/lines for drawing. You can for example simply plot points on the screen. You can draw continuous lines, rectangles, triangles, arcs and even circles. An interesting point is that the circles can be drawn in two different ways, you can either specify the radius and then the circumference or vice versa, the only problem with this is that you tend to forget which option you are using. Again the UNDO option comes in handy if you do make a slip.

The GCP *Art Studio* is probably the easiest to use graphics package that I have ever used on a Commodore computer. What is unusual is the fact that ease of use doesn't mean that it isn't a powerful program. In fact the *Art Studio* is also one of the most powerful graphics packages I have used. Rumbird, who markets the program, say that an Advanced *Art Studio* is being worked on. My only question is what on earth are they going to put in it?

## Picasso's Revenge

Originally an American and imported into the UK by Perision Software, this package has one major difference over the others. Its controller is included with the price.

Rather than being controlled by a joystick, etc, this program comes complete with a light pen. If you have never seen one of these before, a light pen is rather like a biro. One end of it plugs into the joystick ports of your computer, you then 'draw' on the screen with the other end. It is worth pointing out that you don't actually draw on the screen, the computer 'looks' to see where your pen is and places a dot on the screen at the relevant point.

*Picasso's Revenge* has all of the normal facilities that you would expect from a graphics package, though there aren't too many 'fancy' ones.

When loading the program, the first menu allows you to either load a printer program or the graphics package.

The printer program is especially useful as it allows you to load in pictures that have been saved with other programs, for example *Double* and *Knobs Paint*. In some cases you can even make final alterations with the light pen before you do any print out.

When in the drawing package the menu options appear at both the top and bottom of the screen. These can be removed with the F2 key. Pressing it again will bring them back so that you can change commands.



Going from left to right across the bottom of the screen the following options are available:

### Disk Mode

This option allows you to **SAVE** and **LOAD** your picture files from or to disk.

### Fill Mode

This will fill any enclosed area with either a texture or solid colour. After selecting this option you simply point your pen at the area that you want to fill and away it goes. If the area that you choose for the fill isn't totally enclosed then the fill will not take place. This is extremely useful as on some packages the fill would continue through the slightest gap, obliterating the rest of the picture.

### Print

This option is used to dump the current graphics screen to your printer. As with the *Art Studio* the printout uses shades of grey to represent the colours.

### Zoom

Magnification of an area of the screen is available with this command. Once the screen is magnified you can scroll around the picture making changes when necessary.

### Mirror

This command is great for making pretty patterns. Quite simply everything you draw will be mirrored in

both a horizontal and vertical direction, rather like a kaleidoscope.

### Focus

In use the actual accuracy of the light pen varies quite a lot, this allows you to alter just how sensitive the light pen is. However, there is a trade off, the higher the sensitivity the slower the actual drawing, etc.

### Draw

This is the option that allows you to produce your "scribble" on the screen. Simply move the light pen around and the ink will follow your pen leaving a trail.

### Brush

The width of the brush that is used in the draw option is selected with this command, to the right of this is a window that shows you the width of the brush that is currently in use.

### Colour 2

As with *The Art Studio* you have the option of using textures to fill in areas of the screen. This option creates a secondary colour for the texture. Careful use of this command can lead to some extremely interesting shades being displayed on the screen.

### Textures

Changing the actual texture that you draw or fill with is simply a matter of pointing at this box and the texture

that you require appears in the window. Unfortunately if you want to redesign any of the textures you must do this before entering the graphics screen. This can be a problem when you are in the middle of producing a piece of artwork and you suddenly decide that you could use a certain texture in it. Your only option is to save your picture and start the program again.

### Shape Menu

Selecting this option brings up another menu on the screen. This menu allows you to select lines, triangles, rectangles, circles, etc. You can even write text on the screen.

Also within this menu are commands that will let you move areas of the screen around, you can copy areas of the screen.

*Phrasie's Revenge* is not the most complex graphics package I have used. However, it is great fun to play with. I can't help thinking that the program is probably more suitable for children rather than an experienced artist. The fact that the light pen isn't quite as accurate as other types of controller may also put some people off.

### Artist 64

This program from Wigmore is the most complex and most versatile graphics package that I have seen for the C64. It isn't as easy to use as some of the other packages available as there are some extremely powerful commands. However, time spent trying to find your way around the package will be well worth it.

As with the *Bambird* package this program can be controlled by a number of different devices. Options available include a mouse (the NICO or MS2000) or a joystick. My personal preference is to use a mouse, though you do need quite a lot of clear desk space if you wish to use this option.

*Artist 64* is menu driven, however, unlike the previous two packages the menus are not present on the drawing screen, you have to snap between screens using the fire button, or mouse. This is actually better since you can see the whole of the drawing area at one time. These menus are available, these are the I/O Menu which controls actions involving disks, savarries or even printers.

The Main Menu is obviously the one that you will be using the most often. This is where you will find the





actual drawing commands that you will use to design your pictures.

The final blend is the SPIN Menu (special effects) this screen gives you the options of designing your own brushes, patterns, and even colour cycles. But most of this later.

As you would expect all of the normal drawing commands are available together with a few that are unusual, yet useful. Options are included for drawing freehand, drawing lines, circles, ellipses, rectangles, triangles and even polygons. At first you may think that some of the usual commands such as *Recs*, etc. are missing, however, you'd be wrong.

One extremely powerful command is the *RCF* option. This remembers the cursor position. When you next draw a line or a shape then you will automatically begin drawing at that previous start position, no doubt you can now see where you get your fruit. Using the *arc* last command will cause geometric shapes to keep their dimensions. You can then place the shape wherever you want it on the screen. Useful for details such as windows in houses, etc. Taking this a step further, you can turn on the continuous command. Once this is on you can leave a trail of the shape behind as you move around the screen.

And there's still more. If you turn on the *CYCLE* option the colour that is being used to draw with at the moment will change, the actual cycle of colours being specified by you in the SPIN menu. Now you can leave a trail of multicoloured shapes behind you. Should you want the shape to be filled in you would simply turn on the *SOLID* option. As you can see the options are many and extremely varied. Don't forget that many of them can be used with different commands such as circles, polygons, etc.

One extremely useful option is the

ability to define an area of the screen as a sprite. Once you have done this you can place your sprite wherever you want on the screen, you can rotate it, place it in front of or behind other colours, you can even use it as a brush to paint in areas of the screen.

Within the SPIN menu it is possible to 'protect' any colour from being overwritten by another. This is great when you come to adding detail to your pictures. For example, say you had a picture of a castle and wanted to add green grass around it. Simply protect the colours that are used in the castle from being overwritten and whatever you do with your green pen or brush the castle will not be in danger of being 'soiled' on.

One extremely interesting feature, and one that I have never come across before is the ability to *RECORD* your drawing actions. You could, therefore, draw your masterpiece with record switched on and watch yourself draw it again at a later date. I'm sure that a facility like this could be useful for demonstrations. You could draw up a picture of a car engine etc. and then label the necessary parts, even make changes when required. Then at a later date you could replay this to your audience, I can't help thinking that this option is quite what could be needed to do this as your audience would have to sit and watch you actually draw the picture and then snap between scenes as you label your shape etc.

It would have been better if you could have stored pictures at different stages and then replayed the cycle rather like a set of slides. Obviously this is possible if you keep going to the I/O Menu and saving your pictures and at a later date load each one in turn, but I'm sure the record option could have done something like this.

Not every package is perfect, and this one is no exception. One major

gripe is the fact that any text entry must be done by pointing at a keyboard that appears on screen. You can't type on the keyboard. The reason for this is that the mouse continuously sends information to the computer, much of this seems like a keypress to the computer which would quite happily think you had typed it. This would make your text total gibberish. The on screen keyboard does seem to be the only way out, but it is a bit of a pain.

The text option is extremely powerful and allows many different sizes. The smallest that the text can appear is 5x5 dots. If you really want you can take this right up to a maximum of 160x200 dots, which is very big. You can even print your text down the screen or in italics.

I have only touched on the possibilities that are available with this package. In fact there are many instructions that I haven't even looked at. If you are nervous about your computer are then I suggest that this is one package that you shouldn't be without, it may be complex and take some getting used to but it is the most powerful.

## On Your Own

I have only had a look at three of the more recent packages, there are many more available in the shops. If you do want to get into computer art then I suggest that you take a close look at the manual of any package before you buy it to make sure that all the options that you require are there.

Out of the three packages that I have looked at here, *Picasso's Revenge* is by far the simplest to use and as a recent vet afternoon proved, great fun for the kids. The *OCF Art Studio* is extremely well presented, easy to use and very powerful. If you don't already own a graphics package then this may be the one for you. On the other hand if you intend producing a lot of graphics pictures with your C64, *Artix 94* can't be beaten. **TE**

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## Caption Competition

Amanda Barry of Arisaiah, one of the leading lights of the software industry, has been having some problems during the vast amounts of games which reside in the Arisaiah Current Garden headquarters. The situation has got out of hand and now she's been totally snowed out as you can see in the photograph.

We decided to come out in sympathy and use the pic for a caption competition. The best three caption writers will each get a crispy five to send your entry by Friday 26 November 1989 to Your Commodore, Arisaiah Caption Competition, 1 Golden Square, London W1R 3AB.

## Last Word

We hope that you enjoy using the free tape on the front of this month's issue. There are some excellent programs on it which we believe are up to the usual Your Commodore standard.

Next month look out for our Christmas Buyer's Guide, packed full

of precise ideas to make a Commodore owner's life really worthwhile.

We'll also be publishing a superb icon program for the C64. Entitled WMPS, it's a windows icon and music program.

Our Christmas issue will contain three and much more for all Commodore owners so don't miss it.

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